

RECLAMATION AND REGENERATION OF THE ANCIENT BARAY

A Proposal for Phimai Historical Park

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ABSTRACT

This project of “Reclamation and Regeneration of the Ancient Baray: A Proposal for Phimai Historical Park” aims to create a new destination for cultural tourism. It is also concerned with preservation of archeological site, objects, and artifacts, centering on the Phimai’s Old Baray in Phimai Town. Phimai Town is considered to be one of most important historic towns. Phimai Town was an ancient city dating to the 11th century. Today there are traces of many layers of communities, all of them overlapping. It is also the location of the biggest Khmer Sanctuary in Thailand. Phimai town has many of the archeological sites within and in surrounding area. Of these, the Phimai’s Old Baray, a water reservoir, is very important archeological site both for Phimai Town and for Thailand. Phimai's old Baray located on the south side of the town, has been dried for century and is being considered for restoration back to its original state by the Fine Arts Department of Thailand. The *baray* is a key element of Khmer urban planning design because it plays an important role in the water management system. Water is an essential resource for people both in the ancient time and in the present time. This project forces on the re-design of urban planning at Phimai's Old Baray. The aim is to bring back the important archeological site, Phimai's Old Baray, a step that will be advantageous to the agricultural industry for local usage. Another aim is to promote Phimai's Old Baray as a new cultural tourism attraction, and as an asset for Phimai Town by creating a conceptual link to the ancient Khmer Empire. The combination of archeological site, agricultural industry, and cultural tourism will enhance the new urban experience and cultural values of the present community and also direct to development of the community in the future in appropriate ways.

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INTRODUCTION

Significance of the Project

Phimai Town can be considered as the center of the territory of Nakhon Ratchasima (Khorat). It is one of the important North-East provinces in Thailand. It houses the grandest and most important Khmer historical sites in Thailand: The Phimai Historical Park. In 1936, The Phimai Historical Park came under the protection of the Thai government's Department of Fine Arts. It began step-by-step restoration processes since the 1950s and the 'Phimai Historical Park' was finally opened in 1989. Within the park sits the Phimai Sanctuary (Prasat Hin Phimai). The dimension of the main sanctuary is 565 meters wide and 1,030 meters long, with a rectangular shape. The sanctuary has beautiful carved sandstones and laterite structures¹. The sanctuary is situated in the middle of the town center and is surrounded by public roads, government offices, and commercial and residential buildings. However, Phimai Sanctuary is not the only important archeological landmark in Phimai Town; there are several other important archeological landmarks located within and surrounding areas. One such example is the *baray*, a water reservoir.

The *Baray* is a key element of the Khmer urban planning. It plays an important role in the water management system. Many of the archaeologists believe that these reservoirs were constructed for agricultural irrigation. It also provided a sustainable existence in harmony with the environmental. The *barays*, or reservoirs, were an integral part of the irrigation system, combining beauty in both form and function since the earliest days of Phimai Town development. In present days, Phimai Town is slowly becoming the center of the district-level.

¹ Dr.Sommat PhonKoet, *Prasat Hin Phimai: Phet Nam Ek Haeng Wi Mai Pu Ra* (Bangkok: D.K Book Distributor.CO, LTD, 2011), 35-45.

The town's expansion is becoming an issue. The density of population, residential and commercial, are leading to problems in the surrounding ancient environments in Phimai. These problems involve land use, town scenery, and the destruction of archaeological sites.

In 1964, Phimai Town, registered under government's Department of Fine Arts, started conservation responsibilities. The Fine Arts Department has been a model example for conservation efforts and respected by locals in the preservation of Thai cultural heritage site in Phimai. Since there are over 7,253 archaeological sites in Thailand, the government has limited resources but has many complicated restoration and conservation processes that it cannot keep up with the maintenance of all of the archaeological sites throughout². Phimai Town is also one of the archaeological sites that the government cannot keep up in regards to the maintenance. The expansion of society in Phimai town has an impact on the ancient town scenery environment. Also, Phimai Town is considered as a public archaeological site, the practice of presenting archaeological data and interpretations of that data to the public. There are many urban encroachments in the area of archaeological site, lack of control over the construction of a building, lack of control over the ownership of the land issue in the area of ancient town³. The ancient urban planning developed to the modern town. The Cultural heritage sites were covered with crowded modern buildings. It is because of these issues that Phimai Town is facing that I am creating the project to present the development and preservation model that will help the Thai government integrate tourism cultures and ceremonies centralized around archaeological

² Walter Jamieson, and Pawinee Sunalai, "The Management of Urban Tourism Destination: The Cases of Klong Khwang and Phimai, Thailand," *UMP-Asia Occasional* (2002): 13.

³ Sunanta Chutinan, "Cultural Heritage, Interpretation, Management and Promotion; Phimai Historical Park" (PhD diss., Sinlapakon University, 2008).

sites to nurture treasures and unity within the community local by using the urban planning methods.

Moreover, Phimai town will most certainly see more expansions in the future. The new way of the urban planning in Phimai town and in surrounding areas should be considered in order to work with and benefit from this issue. As a result, there can be conservation and preservation benefits on three major areas: archeological sites, agriculture industries, and cultural tourism. To make these benefits happen, the new way of the urban planning will focus on the area of Phimai's Old Baray as the center. Since Phimai's Old Baray is one of the most important archeological sites in Phimai Town, conversation and preservation of the site are necessary. Also, its functions were actually traditional irrigation in agriculture and it provides visual beauty for the environment. Because of these properties, The Phimai's Old Baray can be considered as a new destination for cultural tourism attraction.

Scope of Study

In this study, the focus is to establish an improvement in preservation of environment of Phimai Town, especially on the Phimai's old Baray (manmade artificial pool) corresponding to the concept of cultural tourism development program for the heritage properties (See Figure 1). This enhanced the value of the historical element of the old Phimai and promoted the economic and social role of the people who settled in the present.

The first plan of action is to do the site analysis to create an effective development and conservation plan for the Phimai Town. It is essential to understand Khmer architecture and its Water Management System. The research will investigate the urban development over time to date around the area of Phimai town and its Old Baray located on the southern side of the town. It will also demonstrate the link between Phimai Town and the Phimai's Old Baray to be tourism

attraction final destination. Also cover the overall condition of the present settlement in Phimai town and condition of the present settlement around the Phimai's Old Baray.

Secondly, the plan of this project is to develop the cultural tourism Land-Use Restrictions concept around the area of Phimai's Old Baray. Also, to design the new modernized architecture of urban planning design/architectural/landscape to create visitors' events to the Phimai's Old Baray that will be tourism attraction for Phimai Town. The design will be to enhance visitor's understanding and enjoyment of the archeology sites (See Figure 1).

Final outcome of the study will be focused on the development of the main road from the old *Baray* at the southern part of the Phimai City to the Phimai Sanctuary. The development will be linked between the old *Baray* to the Phimai City to create a clear picture of the cultural tourism.

Objectives of the study

1. The purpose of this study is to devolve the Phimai's Old Baray, one of the important archeology site in Phimai Town to become one of the Final Destination Cultural tourism.
2. To propose the usage of the new modernized architecture urban design techniques that are suitable for Phimai Town and the Phimai's Old Baray visitors to enhance visitor's understanding and enjoyment of the archeology sites.
3. To contribute to the Restriction laws protection as archeology heritage around the area of The Phimai's Old Baray for the next generation as well as enhancing visitor's experience and benefiting the local community.
4. To establish a heritage preservation management urban planning model for the integration of the heritage site, cultural tourists, and the agriculture. Hopefully, the heritage preservation management urban planning model presented here can be implemented at other heritage sites in Thailand and other countries in the world. Also

this project can be propose to the Fine Arts Department of Thailand to create the New Cultural Tourism attraction for Phimai Town in the future.

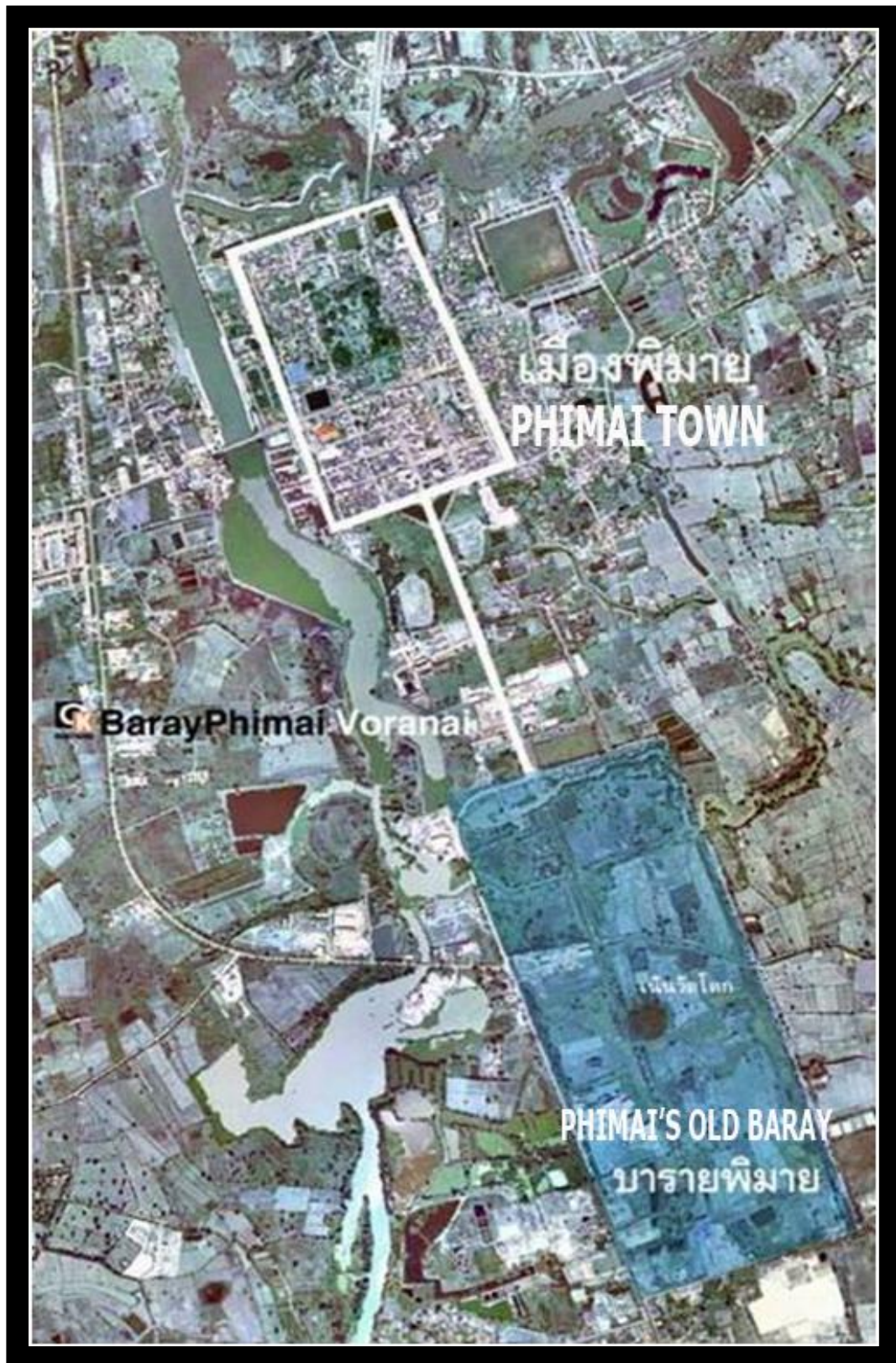


Figure 1: Scope of study; the boundary mapping of Phimai Town and the Southern Phimai's Old Baray (2012).

Source: <http://www.oknation.net/blog/voranai/2011/04/30/entry-1>

Chapter 1

Historical Development of Khmer Empire

HISTORICAL DEVELOPMENT OF KHMER EMPIRE

The Khmer Empire was once one of the most powerful empires in Southeast Asia. It was a kingdom located in Southeast Asia from 790 until 1431 AD. At its height, the Khmer Empire covered about half of Southeast Asian area. Phimai Town was once a territory of the Khmer Empire (modern day Cambodia), thus, its architecture and urban planning are heavily influenced by Khmer culture. The architectures and art in Phimai Town show a great evidence of ancient Khmer civilization. Phimai Sanctuary (Prasat Hin Phimai) look and design are similar to that of the Angkor Wat. It also served similar functions for worshipping the gods in the Hindu religion. One of the most common elements in Khmer's urban planning, the Baray or a water reservoir, was located on the southern of Phimai Town. Because the Khmer civilization was known for its unique architecture, sculpture, intricate irrigation systems, and roads, the historical development of Khmer Empire must be study in this chapter in order to understand Phimai town and its surrounding area.

1. 1 History of Khmer Empire

In the 9th to the 15th centuries of Common Era (C.E), Khmer were the dominant power in Southeast Asia. The Khmer empire spread over all of modern Cambodia, south and east into Vietnam, north into Laos, and as far west as the Thai peninsula, and to border with modern Malaysia in the 12th and 13th centuries. The whole northeastern part of Thailand, which can be identified as Isan, was once part of the Khmer territory.⁴

⁴ Dr.Sommat PhonKoet, *Prasat Hin Phimai: Phet Nam Ek Haeng Wi Mai Pu Ra* (Bangkok: D.K Book Distributor.CO., LTD, 2011),25

The Khmer empire was an extension of the Funan and Chenla civilizations of the 1st to 8th centuries. The Chinese ambassador, Kang Tai, who traveled to Mid-Funan Kingdom recorded "In 1st century, The Funan Kingdom was raised by the Brahmans from India." Archeological evidences, such as Chinese archives, and ancient antiques were found on the site show the civilization of Funan kingdom⁵.

The political administration of Funan kingdom was influenced by Indian political system. The king was the highest authority and his position and was considerably supreme. Kingship became hereditary and the king was responsible for defense and maintaining the law and order of the kingdoms. Moreover, they had vast empires and tried to extend their territories.

According to Chinese archives, there were two main religions in Funan kingdom, Vaishnavism and Buddhism. Two major branches of Buddhism are Theravada ("The school of the Elders") and Mahaya ("The Great Vehicle").

In 5th Century, Chenla kingdom came over power after the fall of Funan kingdom. The founder of the kingdom, was Strutavarman. He managed to break free from Funan's control. A later king, Bhavarman, invaded Funan annexing it to Chenla's domains. Once Chenla established control over Funan, they embarked on a course of conquest that continued for three centuries. They subjugated central and upper Laos, annexed portions of the Mekong Delta, and brought what are now western Cambodia and southern Thailand under their direct control. At the same time, king Mahendravarman established peace with the neighboring kingdom of Champa through marriage arrangements, and Isnavarman, who succeeded him, moved to a new capital, which, according to a Chinese writer, was inhabited by 20 thousands families. Culturally, the

⁵ Nona Paknam, "Sinlapa FuNan ChenLa Nai Siam (Art of Funan and Chenla Empire in Thailand)," *Mueang Boran* (1976): 28-35.

royal families of Chenla generally preserved the earlier political, social, and religious institutions of Funan, thus preserving the elements introduced from India. Chenla appears to have had a preference for Hinduism over other religions brought from there, like Buddhism⁶.

In the 8th century, however, factional disputes at the Chenla court resulted in the splitting of the kingdom into rival northern and southern halves. According to Chinese chronicles, the two parts were known as Land (or Upper) Chenla and Water (or Lower) Chenla. Land Chenla maintained a relatively stable existence, but Water Chenla underwent a period of constant turbulence, partly because of attacks from the sea by the Javanese and others. The Prince of the Water Chenla was captured as a prisoner of war.

Later on, the Khmer king returned to Cambodia around 780 C.E, Jayavarman II, who returned to reclaim his legacy from Javanese dominion. He is widely known as the king, who laid the foundation of the Angkor period in Cambodian history. He combined both Chenla (Land and Water) together as one kingdom. Jayavarman II founded Hariharalay, an area now called Rolous. King Jayavarman II was proclaimed as God King or Deva Rajam, the antefix varman, means "protector". According to some sources, Jayavarman II had resided for some time in Java during the reign of Sailendras. At Jayavarman period, Sailendras allegedly ruled over Java, Sumatra, the Malay Peninsula and parts of Cambodia⁷.

In Khmer history, the beginning of the Angkorean period started at 802 C.E. A new political capital was located at sacred Mount Mahendraparvata, now known as Phnom Kulen.

⁶ Charles Higham, *The Civilization of Angkor* (London: Weidenfeld & Nicolson, 2001), 98-100

⁷ Benny Widiono, *Dancing in Shadows: Sihanouk, the Khmer Rouge, and the United Nations in Cambodia* (New York: Rowman & Littlefield Publisher, 2008), 150-179.

Phnom Kulen was founded by Jayavarman II (See Figure 2 and Figure 3). It is near Angkor as in the present day.

Indravarman I is one of Jayavarman's descendants (reigned 877-879). He was one of the important king in the Khmer history. Indravarman was the first king in Khmer history, who built the first Khmer stone artificial temple mountains. The temples called Bakong and Preah Ko, dedicated to the Siva cult. He also constructed a manmade lake, known as *baray*, at the northern of Hariharalaya called Indratataka. The *baray* used as the lake contributed to agricultures and also significance as symbol of kingly powers⁸.

Indravarman I was credit for extensive building program in Khmer empire. He set some rules for the future Angkorian kings to follow. The three important king's acts was that the king needs to perform a public service for his subjects by building an irrigation network for the rice fields. The second act was to build shrines and dedicated them to his god, ancestors, and parents, etc. Lastly, the king must build a temple-mountain, which he dedicated to a liṅga called after himself. Khmer empire under Indravarman I's ruler spread farther into the area of Northwestern area of Ubon Ratchathani, Thailand as in the present.

Indravarman's successor Yaśovarman I (reigned 889 - 910) was one of the great Angkorian kings. Yasovarman I was decided to move the capital from Hariharalaya to the new empire of Yashodharapura or Angkor, where it remained there for 500 years. According to the Lolei inscription K. 324, Yasovarman I built up an elaborate family tree, connecting himself through his mother with ancient kings of Funan and Chenla⁹. Yaśovarman I was the first kings'

⁸ PhonKoet, *Prasat Hin Phimai*, 65.

⁹ Chit PhumSak, *Tamnan Haeng Nakhonwat (The tale of Angkor Wat)* (Bangkok: CharoenWit Publisher, 1981), 90-102.

religious preferences shifted to Mahayana Buddhism. However, He also built numerous other Hindu temples and ashrams, or retreats for ascetics. He built a memorial temple dedicated to Shiva and to members of the royal family called Lolei. Yasovarman I started to dig a huge new artificial lake, the Yashodharatataka or the East Baray. Yasovarman also built Phnom Bakheng at atop a hill to serve as the new center "temple-mountain" for his city. The Phnom Bakheng (See Figure 5) is a Hindu temple that dedicated to Shiva, incorporated long processional staircases on four sides and a stone of five towers. He also built temples on other mountain, including Khao Pra Viharn, located on the modern Thai-Cambodian border. After he passed away, he was called the "Leper King".

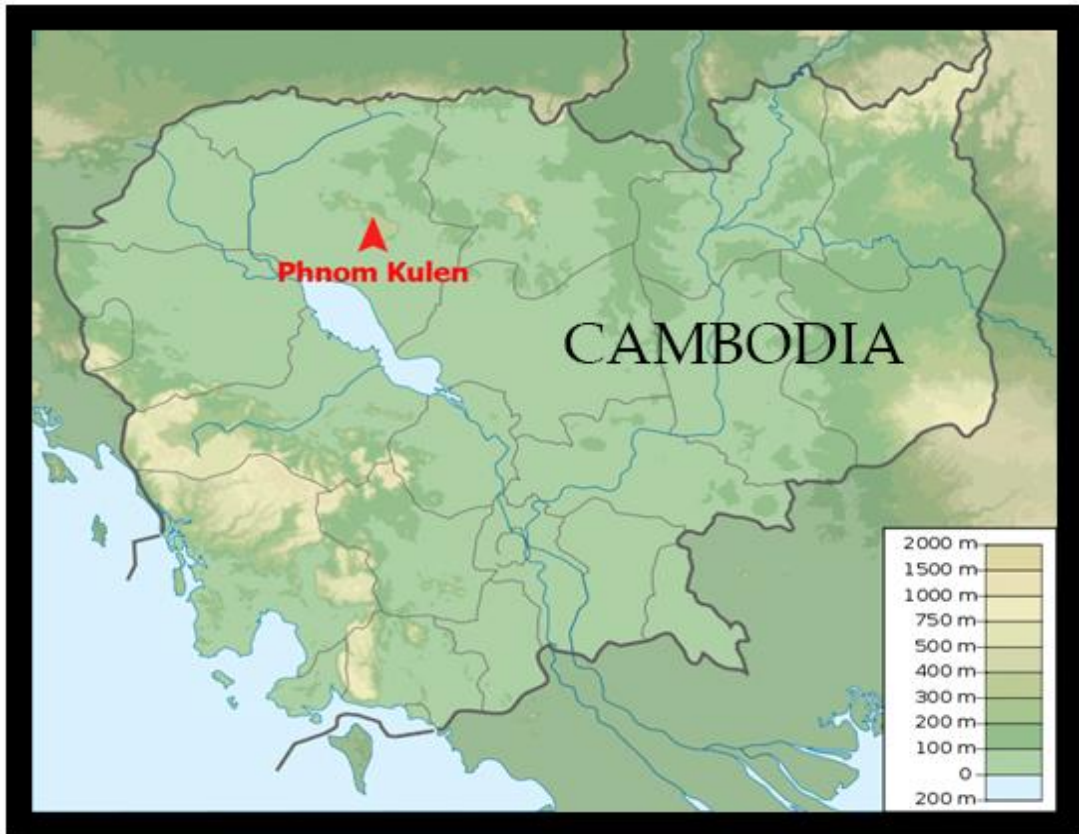


Figure 2: Location of Phnom Kulen in Cambodia (2013)

Source: http://en.wikipedia.org/wiki/File:Cambodia_physical_map.svg



Figure 3: Phnom Bakheng, just after sunrise.

Source: <http://www.robjagnow.com/travel/cambodia05/>

Successors to Yasovarman I extended the building program at Angkor furthered the power of the Khmer empire. Suryavarman I (reign 1002-1050) pressed the boundaries of his kingdom into Thailand, absorbing Lopburi, and up to the Gulf of Siam in the south. In 1113 AD to 1145-1150 AD, Suryavarman II successfully fought off challenges from the Thai and Cham¹⁰. Suryavarman II was built the most famous Cambodia's temple, Angkor Wat, which he dedicated to the Supreme God Vishnu (See Figure 7). Suryavarman as one of the empire's greatest kings in the Khmer historians because of his monumental architectures, strong military campaigns, and the restoration of a strong government. Suryavarman was given the posthumous name Paramavishnuloka, "He Who Has Entered the Heavenly World of Vishnu." Angkor Wat appears to have been completed only after his death.

In 1181, came a new great king in the Khmer history, Jayavarman VII, he was the son of King Dharanindravarman II and Queen Sri Jayarajadudamani. He devoted himself to Buddhism, as only one prior Khmer king was a Buddhist. Jayavarman VII, who ruled from 1181 to 1220, eventually rebuffed the Chams and rebuilt the capital. He was the most prolific builder of all Cambodian kings; most of the visible Angkor can be attributed directly to him. Over the 30 years of his reign, Jayavarman VII have identified three stages of building program. The first stage, he focused on the useful construction, such as hospitals, rest houses along the road, and reservoirs. According to the Preah Khan inscription, he built 102 hospitals to treat all of his citizens. Secondly, He was built many of the temples dedicated in honor of his parents. Finally, he developed the new city of Angkor Thom ("Great City")¹¹(See Figure 6). Jayavarman VII reconstructed the Khmer capital by building many of the best known of Angkor's temple, such as

¹⁰ PhonKoet, *Prasat Hin Phimai*, 10.

¹¹ Chaemkaeo Khilai, *Charuek Phrachao Jayavarman VII (Inscribe of King Jayavarman VII)* (Bangkok: Krung Siam Publisher, 1995), 46-65.

the Bayon (begun in the late 12th century), Preah Khan (built in 1191), Srah Srang --"the royal bath"---and the most famous ruined temple Ta Prohm (begun in 1186). Jayavarman died in about 1215, at an advanced age ranging from 85 to 90. Jayavarman VII remains as a Buddhist king with great respect, a potent symbol of national pride for Cambodians. Today, Cambodia finally became a Buddhist country. However, it follows Theravada Buddhism, not the Mahayana Buddhism as practiced by Jayavarman VII.

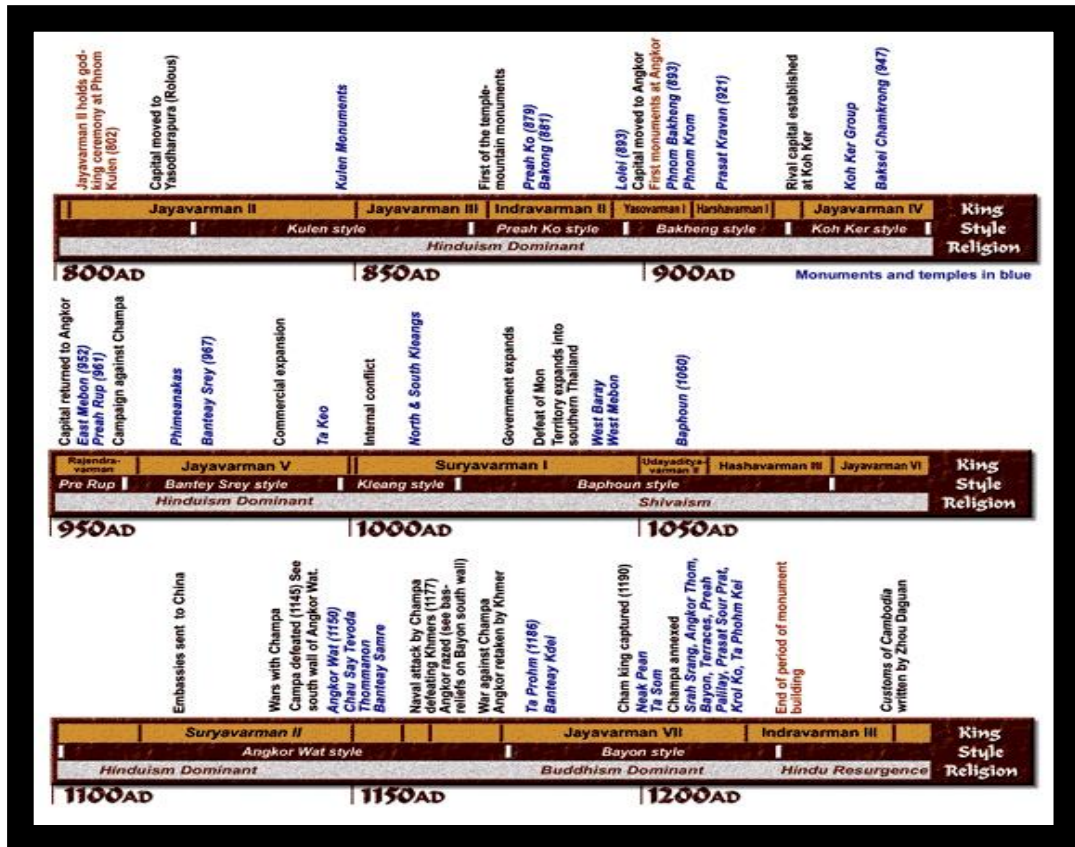


Figure 4: Timeline and list of King List of the Khmer Empire.
Source: <http://www.canbypublications.com/siemreap/history.htm>



Figure 5: The west side of Angkor Wat.
Source: <http://iliketowastemytime.com/>



Figure 6: The South Gate of Angkor Thom.
Source: <http://chrisglss.com>

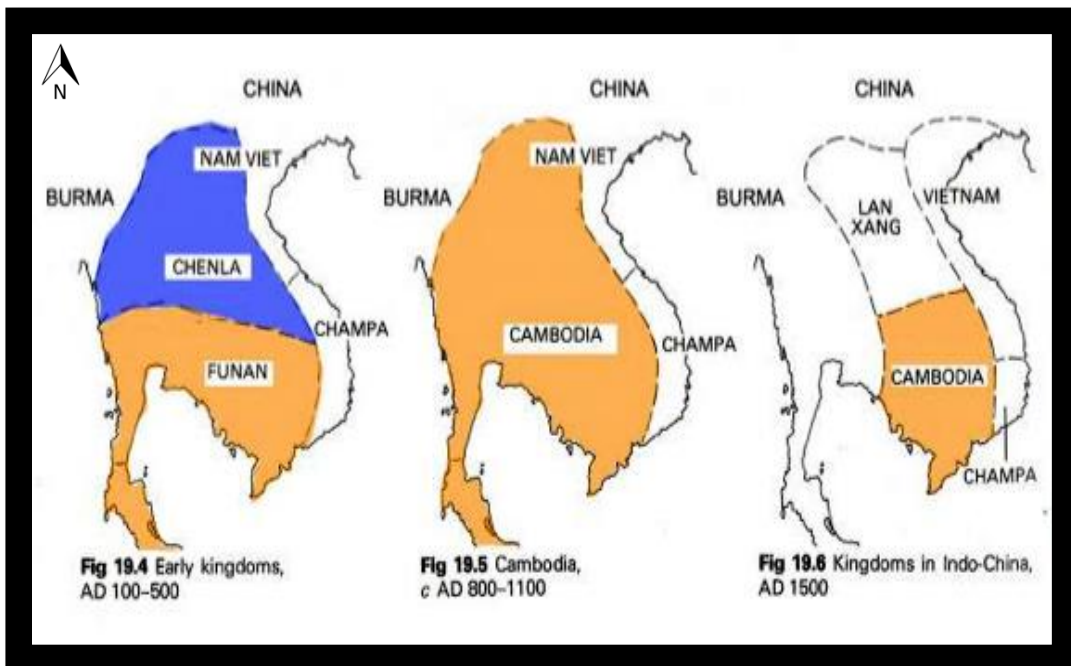


Figure 7: Map of Territory of Khmer Empire from AD 100 AD 1500.
Source: <http://warfarehistorian.blogspot.com/2013/07/angkorian-warfare-1113-1220-conflicts.html>

The Khmer empire continued to spread over much of the mainland in Southeast Asia until the 15th Century, when other power emerge in the region. In the beginning of the 10th century C.E, Thai people had begun to migrate into mainland of Southeast Asia with the greater numbers. Although Thais were used as mercenaries by the Khmer, by the 14th century, Thais were a threat to the Khmer empire. There are records of series of attacks by Thais armies¹². Eventually, Angkor was subjugated by Thais armies, but the Thais left Angkor to be ruled by local nobles, who were loyal to Thais. The story of Angkor faded from historical accounts from then on.

1.2 Khmer Empire Water Management System

The Khmer empire is recognized for its impressive sanctuaries, but researchers today also pay attention to an uncovered extensive channel network stretching across over 1000 km. The water channel network connected with large reservoirs (termed *Baray*) formed the structure of the Khmer empire city. It was the basis for Khmer empire water management. Long, dry seasons with the monsoon climate has challenged water management for centuries. The extensive water management system have played an important role in the mitigation of such marked seasonality¹³.

In the early days of the Khmer Empire, people used agriculture products to feed a growing population but also used for trading purpose. The main recourse of the Khmer agricultural system was the Mekong River and Tonle Sap Lake. Together with the new technology for water management system and hard work of the Khmer people, these two water sources became the main water sources for all the farmers across the empire to harvest

¹² Miriam T. Stark, "Pre-Angkorian settlement trends in Cambodia's Mekong Delta; and the lower Mekong archaeological project," *Indo-Pacific Prehistory Association Bulletin*, (2006): 35-37.

¹³ Matti Kummu, "Water management in Angkor: Human impacts on hydrology and sediment transportation," *Journal of Environmental Management* 90 (2009): 1415-1420.

agricultural products such as rice. In addition, Tonle Sap Lake was also the center of the fishing industry¹⁴.

The key of the Khmer empire's success was the ability of the Khmer people to take advantage of the water and control the water of the Mekong River, and Tonle Sap Lake. During the wet season, the Mekong River flooded, Tonle Sap Lake would swell to cover an area of around 10,000 square kilometers. When the rivers get full with water, the Khmer would channel water from the lake into water manmade reservoirs (*Barays*) and canals to agricultural farm, so that it could be stored and used throughout the dry season when there was very little rain¹⁵. This enabled the Khmer to harvest rice three or four times per year, while most other civilizations across South-East Asia could produce only one or two harvests.

The use of water was used not only to grow agriculture crops but also to fill the moats that surrounded Khmer temples (such as Angkor Wat) and royal buildings as a wall. Water was channeled to parts of the empire where new temple building was taking place in order to support growing numbers of people who had moved there to work on the construction. The *Barays* (reservoirs) were recourse of fed water. The *Barays* often were constructed before any temple building began. This is done to ensure that those construction people of the temples had a constant supply of food and water¹⁶. The regular supply of water increased the size of local rice crops and

¹⁴ Matti Kummu, "The natural environment and historical water management of Angkor, Cambodia" (paper presented at the 5th World Archaeological Congress, Washington, D.C., USA, 2003).

¹⁵ PhonKoet, *Prasat Hin Phimai*, 65.

¹⁶ Oxford University Press Australia & New Zealand, *The Khmer Empire* (Australia: Oxford University Press, 2012), accessed September 6, 2013, http://lib.oup.com.au/secondary/geography_history/Big_Ideas_Geography_History/8/BI_Geog_Hist_8_ch8_Khmer_Empire.pdf

led to increased trade. This made the empire wealthier and enabled the kings to build even more temples and religious monuments.

1.2.1 History of Barays

A water reservoir is known as a “*Baray*”. It is an area of land where dikes have been raised to catch and hold water. The construction of massive *Barays* began in the 9th century, when *Barays* became one of the marks of Angkorian kingship. The construction of the *Baray* is the building of embankments around the intended perimeter using earth acquired by digging trenches inside the perimeter of the *Baray*.¹⁷ An island temple was set at the center of each *Barays*. Some historians believe that the island in the middle of the *Baray* symbolizes Mount Meru. Mount Meru, in Hindu mythology, a golden mountain that stands in the center of the universe and is surrounding by the ocean. Also Mount Meru is the residence of the god Shiva. All of the Angkor kings believes themselves as God King (Devaraja). Therefore, they built residences and temples to reflect their god-like qualities. In *Baray* case, the reservoir represented the ocean, and the island in the middle represented Mount Meru, in which the shape are always look like a mountain or a pyramid.

According to H.E. Chuch Phoeun, Secretary of State of Ministry of Culture and Fine Arts, "there are four *Barays* in the Angkor complex area and Srah Sraong, each centered by a sacred temple."¹⁸ According to the Old Stone website, "The first great Barays in the Angkor region were Indratataka at Hariharalaya, built by Indravarman I in the late 9th century, and the East Baray at Angkor, also begun by Indravarman but completed by his son and successor, Yashovarman I. The

¹⁷ Mary Beth Day, David A. Hodell, Mark Brenner, Hazel J. Chapman, Jason H. Curtis, and William F Kenney, "Paleoenvironmental history of the West Baray, Angkor (Cambodia)," *Proc Natl Acad Sci U.S.A.* (2012): 1046-1051, accessed September 28, 2013, doi: 10.1073.

¹⁸ FunMan, May 05, 2008 (5:28 p.m.), "The Angkorean Barays of Amrita Water" *Khmersource Blog*, October 05, 2013, <http://khmersources.blogspot.com/2008/05/angkorean-barays-of-amrita-water.html>.

East Baray is a monumental artificial lake measuring 1.8km by 7.5km, which is 1.1 miles wide and 4.7 miles long. As with all the great barays, it was built by excavating and piling up an enormous earthen retaining wall, about 4m-5m (14') tall, around the perimeter, so that the water was held above ground behind what is, essentially, a giant dyke. The East Baray was fed by the Siem Reap River, and would have held 37.2 million cubic meters of water at a depth of 3m (10'). 'West Baray' is the largest and deepest man-made reservoir in the world, used to hold water which supported agricultural projects and the sprawling population of Angkor capital city. The scriptures identify West Baray as an 'ocean'. West Baray was the largest to be built during the Khmer Empire era, and at that time served as largest artificial reservoir in the world,¹⁹ (See Figure 8).

The West Baray is a popular recreation spot with the locals living in Siem Reap (See Figure 9). It is a rectangular handmade lake with an artificial island in its center containing a temple. The Jayatataka Baray is the last great Baray of the Angkor era. It was built by Jayavarman VII, between the 12th-13th centuries²⁰. Because The *Baray* is a big scale construction, about 10,000 man-years were needed to dig and pile up the reservoir walls. The water was most likely used for irrigation. Also, waterworks on this scale must have had stunning religious and political implications. However, the *Barays* were not entirely advantageous for the Khmer people, there were also problems.

"The major problem with the *Baray* system was siltation - the gradual influx of sand, carried by the river, into the reservoir. The East Baray was completed around 890. During the next century, as it gradually became filled up with sand, it was periodically renovated by raising

¹⁹ "The Monuments of Art History-Baray," Old Stone, accessed November 13, 2013, <http://www.art-and-archaeology.com/seasia/angkor/angkorsite.html>.

²⁰ FunMan, "The Angkorean Barays of Amrita Water."

its banks, and new, smaller, barays were constructed to supplement the water supply (Srah Srang, east of Banteay Kidei, mid-10th century). The Baray system had exhausted itself, as the process of siltation outpaced the ability of the Khmer to raise the height of the reservoir walls."²¹

1.2.2 The purpose of Barays

The *Barays* or reservoirs of the temples were an integral part of the irrigation system, combining both visual beauty and function since the earliest days of Angkorian development. It enabled multiple rice crops to be harvested year-round. According to H.E. Chuch Phoeun, "The original purpose if the *Barays* was for irrigation, providing water to cultivate crops, and to supply for the people tending the land. Later on, the water not only supported the agriculture and the people, but was used for ceremonial purposes, occasions such as a king's coronation, at the inauguration of temples and other religious and ritual ceremonies. Our ancestors brought water from each of the four Barays and from Srah Srang, for celebration at those key events. The water in the Baray reservoirs, seemingly as the Amrita water, was attributed with making the Khmer civilization at Angkor era the richest in both prosperity and happiness."²²

The design of every *Baray* has a temple located at its central, this is dedicated to the Spirit of Gods. The great example are Jayatataka Baray that has 'Neak Poan' Temple at its center and the East Baray of the Angkor Wat City has 'Eastern Mebon' Temple²³.

The West Baray also has an island in the middle of the Baray. The temple called 'Western Mebon' Temple. Inside the temple, stood a magnificent bronze statue of the reclining

²¹ "The Monuments of Art History-Baray," Old Stone, accessed November 13, 2013, <http://www.art-and-archaeology.com/seasia/angkor/angkorsite.html>

²² "The Monuments of Art History-Baray."

²³ PhonKoet, *Prasat Hin Phimai*, 74.

Vishnu. Today the Vishnu bronze statue is exhibited at the National Museum in Phnom Penh for its protection. In the Western Mebon Temple, exists a hollow of the Yoni and the Linga. The Linga is a representation of the Hindu deity. The Linga is often represented along with the Yoni. Yoni is a symbol of the goddess Shakti, a female creative energy. The union of Lingam and Yoni represents the "indivisible two-in-oneness of male and female, the passive space and active time from which all life originates."²⁴ Water is a symbolic function of fertility. The belief of the water symbolically surrounding the Yoni and the Linga brings about the prosperous and abundance to rice fields and meadows.

The Neak Poan Temple is located at the middle of the Jayatataka Baray. This towering structure seem to be floating above the surrounding waters. In the past, this temple was only accessible by boat. However, it is accessible by land today. The meaning of Neak Poan is 'entwined by the dragon'. "In Khmer culture, the dragon is the symbol that represent the water." Sambo Manara, a History professor at the Royal University of Phnom Penh, said, "So our ancestor built this temple and put two dragons to wrap for protection and is the perfect representation of the coexistence of earth and water," moreover, "This temple was used as a holy place for health care and treatment to all people, and especially for the soldier before they enter the battle field. The water inside the four pools of Neak Poan temple served as holy liquid or Amrita for giving energy, health and happiness to people during the Angkor era²⁵,"

Today, Scholars are divided on the purpose of the *Barays*. By some theories, the *Barays* held water for irrigation, but no inscription has been found mentioning such a function²⁶. Other

²⁴ "Lingam," Wikipedia the free encyclopedia, accessed November 13, 2013, <http://en.wikipedia.org/wiki/Lingam>.

²⁵ FunMan, "The Angkorean Barays of Amrita Water."

²⁶ Satu Muukkonen, "Water Management in Cambodia-- Resources and Relations" (Master's Thesis, University of Helsinki- Department of Geography, 2007).

theories say that *Barays* served mainly a symbolic purpose in Khmer religious life, representing the seas of creation that surround Mount Meru, home of the Hindu gods.

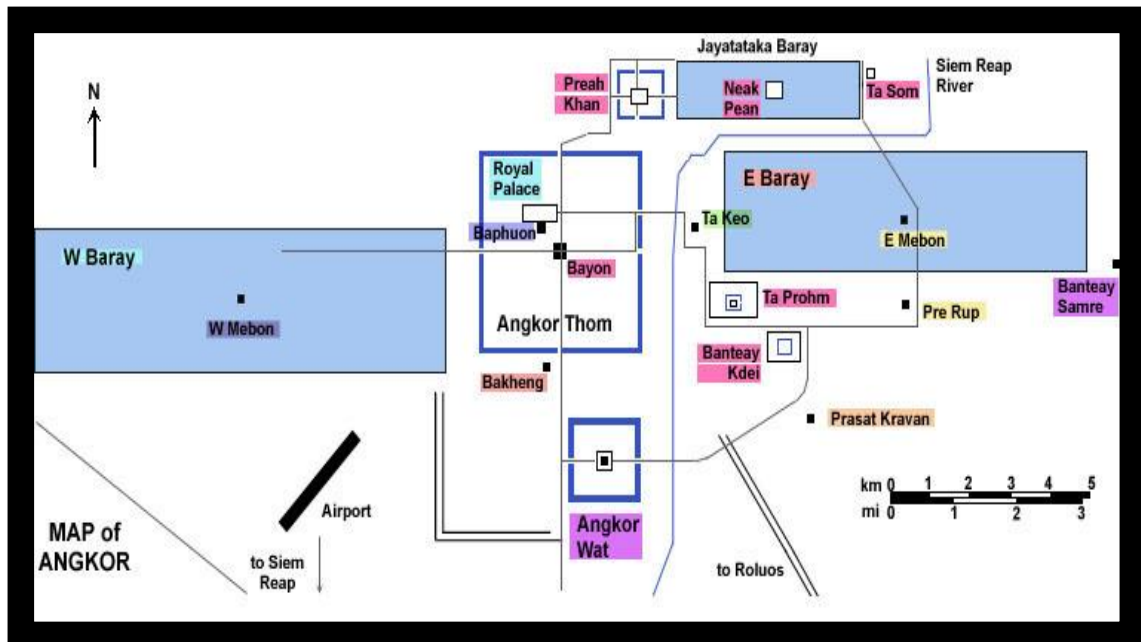


Figure 8: Map of Three Barays in Angkor Wat City; West Baray, East Baray, and Jayatataka Baray (2013).
Source: <http://www.art-and-archaeology.com/>



Figure 9: A reservoir known as the West Baray, constructed in the 11th Century.
Source: <http://destinationcambodia.com/images/pictures/west-baray.jpg>



Figure 10: Many canals built during the Khmer Empire remain in use today. This one links the West Baray with a number of Cambodian villages.
Source: http://g9jzk5cmc71uxhvd44wsj7zyx.wpengine.netdna-cdn.com/wp-content/uploads/2013/03/8_image.jpg

1.4 The Khmer Road System

Over the past 50 years, the Khmer road system has been viewed as parts of the works ordered by a single king, Jayavarman VII, who ruled in AD 1182-1218. In order to expand the religion that the king believed, he ordered the construction of numerous temples and vigorously expanded the empire to its zenith across much of mainland Southeast Asia.²⁷

Based on Hendrickson's argument, the Sanskrit text, inscribed on the stela of the Preah Khan Sanctuary in Angkor, there are two main route; The route between Angkor and Phimai with seventeenth the regularly-spaced building or fire shrines (dharmasalas) found on the Northwest road. This route project must have been at least as early as the 10th century. The second is the intensive state-wide building programmed started during his reign of nearly 40 years.²⁸

The Khmer road system is divided into six main artery expansion from the capital of Angkor Wat for a total of approximately 1,000 kilometers (approximately 620 miles). The secondary road served as local traffic in and around the Khmer cities. It is very a simple and straight route. It is made of earth piled on both sides of the road. The road surface were up to 10 meters (~ 33 feet) wide, and in some places has been raised as high as 5-6 meters (16. -20 Ft) above ground.²⁹

According to K.Kris Hirst from "Khmer Road System Angkor Wat's Transportation Corridors" article, there are six roads led out from Angkor. The northwest route led 250 km (~155 mi) north through Phnom Rung to the town of Phimai, Thailand. A western route led to

²⁷ Mitch Hendrickson, "Historic routes to Angkor: development of the Khmer road system (ninth to thirteenth centuries AD) in mainland Southeast Asia." *Antiquity journal* 84 (2010) : 485

²⁸ Mitch Hendrickson, "A transport geographic perspective on travel and communication in Angkorian Southeast Asia (ninth to fifteenth centuries AD)," *World Archaeology* 43 (2011): 49-52.

²⁹ "Khmer Road System: Angkor Wat's Transportation Corridors," Archaeology About.com, accessed October 25, 2013, <http://archaeology.about.com/od/transportation/qt/Khmer-Road-System.htm>.

Phnom Srok and Sdok Kak Thom, Thailand, a distance of some 150 km (~93 mi). The lower southeast route led along the Thonle Sap lake and eventually ended up at Prasat Andet and Sambor Prei Kuk, about 175 km (~108 mi). The upper southeast road led to Beng Mealea and then Preah Khan for a distance of approximately 75 km (~47 mi); and the northeastern route led 250 km through Koh Ker to Vat Phu, Laos on the Mekong River.”(See Figure 11)³⁰

The information show that three out of six Khmer roads system routed to some area of Northeast, Thailand, which are known today as Buriram province, Sisaket Province, Surin Province, and Nakhon Ratchasima, where Phimai Town is located. These provinces of Thailand are the location of important Khmer Sanctuaries in Thailand (See Figure 11 and 12).

³⁰ "Khmer Road System: Angkor Wat's Transportation Corridors," Archaeology About.com, accessed October 25, 2013, <http://archaeology.about.com/od/transportation/qt/Khmer-Road-System.htm>.



Figure 11: Map of Khmer road system and sites (bridge locations from Bruguier 2000; GIS data compiled from JICA 2003, background-SRTM 90m DEM
Source: <http://srtm.csi.cgiar.org/>

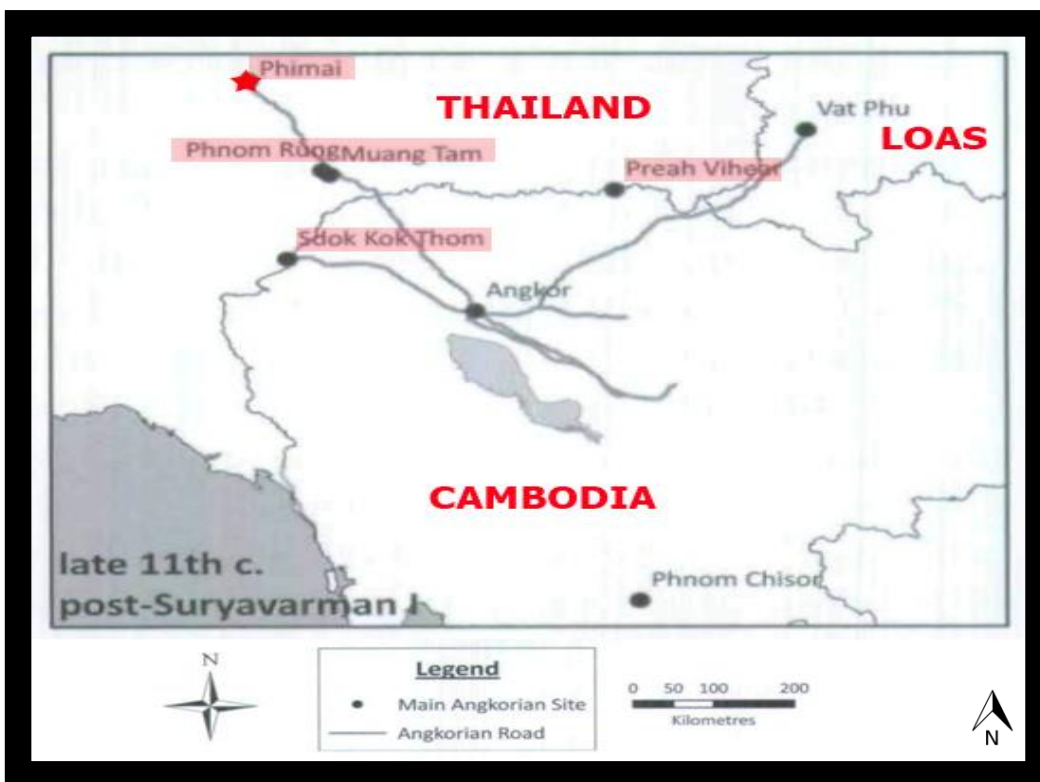


Figure 12: Map of Khmer road system from Angkor Wat City to Some of the province in Northeast, Thailand (bridge locations from Bruguier 2000; GIS data compiled from JICA 2003, background-SRTM 90m DEM
Source: <http://srtm.csi.cgiar.org/>

The main reasons for Khmer road system are primarily economical. It was built to move goods into the capital city of Khmer Empire. Salt, boiled from seawater in the Mekong Delta or mined from the mountain deposits in northeastern Thailand were brought into Angkor City along the roads. Mountain salt were particular products that moved along the northwestern route from Phimai. The roads route not only reflect the goods' transportation, but also reflected political and religious barriers. Also, the roads route indirectly influenced the urban planning and landscape design of the Khmer water system management surrounding the sanctuaries located in the Northeast, Thailand.³¹ K. Kris Hirst, the archeologist and the freelance writer science articles in archaeology said, " The ability to move raw materials to their production zones and on to their markets would have been a critical element in maintaining power: roads allowed that movement around the landscape, across natural barriers and to other transportation corridors. The roads allowed access to scattered temples and temple pyramids important to the Angkor cosmology. The system was intersected with the immense and important aqueduct system which supported water catchment, storage and redistribution to Angkor and surrounding communities."

1.4 Khmer art and architectural style

During the Khmer empire, the Khmer developed and created several architectural and sculptural art style. Philippe Stern and Gilberte de Coral Rémusat, French art historians, were the first to develop an art historical method for sculpture and architecture that remains responsible for much of what we know about Khmer art history, particularly in terms of chronology and stylistic categories. The analysis based on the relatively securely dated monuments, the stylistic sequence of undated sculpture and architecture. These can be

³¹ "Khmer Road System: Angkor Wat's Transportation Corridors," Archaeology About.com, accessed October 25, 2013, <http://archaeology.about.com/od/transportation/qt/Khmer-Road-System.htm>.

ascertained through minute analysis of their constituent parts, in sculpture primarily through details of coiffure, costume, and jewelry, and in architecture, through elements like lintels, pediments, pilasters, etc.³² Philip Stern had divided Khmer art and architecture style into two period; Pre-Angkorian Period, and Angkorian Period.

Pre-Angkorian Period- According to the Sdok Kak Thom stele, the beginning of Pre-Angkorian started from 200 CE until when Jayavarman II was crowned in the Khmer Empire in 802 CE, as following table below:

Style	Dates	Rulers
Phnom da	c. 514-c.539	Funan and Chenla civilizations
Sambor Preikuk	c. 617-c.637	Isanavarman I, Bhavavarman II
Prei Kmeng	c. 638-c.681	Jayavarman I
Kampong Preah	c. 681-c.800	Various
Kulen	c. 825-c.875	Jayavarman II

Figure 13: Table of Pre-Angkorian Period Art Style
Source: Olmtong Ektanitphong

Angkorian Period- According to the Sdok Kak Thom stele, the beginning of Angkorian started from when Indravarman I was crowned in Khmer Empire in 877 CE until the Jayavarman VIII period in 1431 CE, as following table below:

³² H.S.H Prince Subhadradis Diskul, *Sinlapa Khom Vol 1 (Cambodian arts Vol 1)* (Bangkok: Ongkan Kha Khuru Sapha Publish, 1970), 68-72.

Style	Dates	Rulers
Preah Ko	c. 877-c.886	Indravarman I, Jayavarman III
Bakheng	c. 889-c.923	Yasovarman I, Harshavarman I
Koh Ker	c. 921-c.944	Jayavarman IV
Pre Rup	c. 944-c.968	Rajendravarman
Banteay Srei	c. 967-c.1000	Jayavarman V
Khleang	c.968-c.1010	Jayavarman V
Baphuon	c.1050-c.1080	Udayadityavarman II
Angkor Wat	c.1080-c.1175	Jayavarman VI, Suryavarman II, Yasovarman II
Bayon	c.1181-c.1243	Jayavarman VII, Indravarman II
Post-Bayon	c.1243-15th Century	Jayavarman VIII and other

Figure 14: Table of Angkorian Period Art Style
Source: Olmtong Ektanitphong

Post- Angkorian Period- The period of Post- Angkorian started after 1431 CE. The center of Khmer Empire moved to the south of the region, present-day is Phnom Penh, which has remained the capital of the Cambodia. The art and architectural style of the Khmer Empire declined since this period³³.

³³ H.S.H Prince Subhadradis Diskul, *Sinlapa Khom Vol 1 (Cambodian arts Vol 1)* (Bangkok: Ongkan Kha Khuru Sapha Publish, 1970), 105-107.

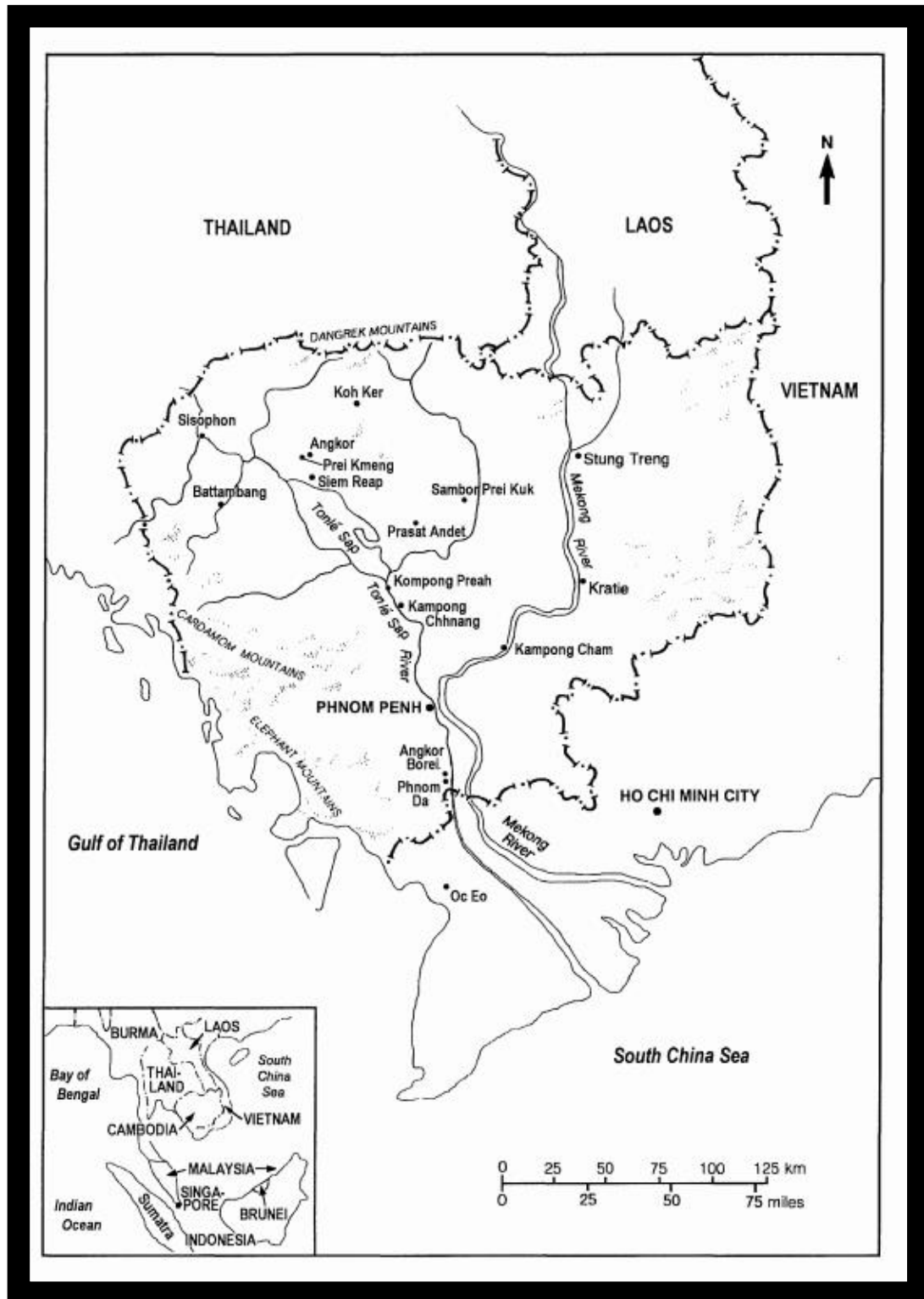


Figure 15: Map of Southeast Asia showing major site in Khmer Empire. Date: Unknown
Source: *A new Date for the Phnom Da Images* by Nancy H.Dowling

1.5 Khmer art and architectural style influence in Thailand

The earliest inscriptions of Khmer in Northeast Thailand dates to the end of the 6th century. One of the inscriptions, erected by a king called Mahendravarman, was found in the province of Surin, Northeast Thailand. Mahendravarman ordered the inscription carved after he had conquered "all the country." Scholars are still debating about where territory was and whether it was conquered by Mahendravarman. Other sources of Khmer's territory in this period are the Chinese accounts. They contain references that in 1st to 8th century, the Funan and Chenla civilization included the southern parts of present day South Vietnam, Cambodia, middle of Laos, and the southern part of Northeast Thailand.³⁴ Moreover, epigraphical analysis shows that Funan and Chenla were only one of a number of polities in which domains were controlled by rulers in the Southeast Asia during the 1st to 8th century.

The inscriptions erected by King Mahendravarman provided an important information that no sanctuary in Thailand can be dated to the end of the 6th century. The earliest structures, such as Phumphon Sanctuary in Surin province dated back to the 7th century. Also no Khmer sanctuary in Thailand can be dated to the intervening 8th and 9th centuries. However, in the 11th century, a number of Khmer temples remain was found in Thailand. Most of the sanctuary were Khleang and Baphuon style.³⁵ Many are three brick towers on single platform, such as Prang Ku Sanctuary in Sisaket province. The period of the Khmer arts and architectural style diffusion from the central capital city to Cambodia through the Thai territory was longer. At the same time, its art influence in each Khmer period must have been longer until the new arts and architectural style came to Thailand. However, the Thai scholar had defined the Khmer arts and

³⁴ H.S.H Prince Subhadradis Diskul, *Sinlapa Khom Vol 1 (Cambodian arts Vol 1)* (Bangkok: Ongkan Kha Khuru Sapha Publish, 1970), 120-126.

³⁵ Chit PhumSak, *Tamnan Haeng Nakhonwat (The tale of Angkor Wat)* (Bangkok: CharoenWit Publisher, 1981), 60-65.

architecture in Thailand as the contemporary art of Khmer in Thailand or "Lopburi" period. The "Lopburi Period" was given by His highness Krompraya Dumrongrakanupap instead of the "Khmer arts and architectural" in Thailand.³⁶ The reason was to avoid a political matter and "Lopburi" period is the best term because Thai people believed that "Lopburi" city is the cradle of Khmer arts and architectural influence in Thailand.³⁷

The Contemporary Art of the Khmer in Thailand

The contemporary art of Khmer in Thailand was divided into two main periods as following;

1. The contemporary art style before the Mahithonpula period
2. The contemporary art style the Mahithonpula period

The reason for using the Mahithonpula reign period to divide the contemporary arts of Khmer and architecture in Thailand is that the Mahithonpula dynasty occupied Thai territory from the first half of 11th century. The Mahithonpula dynasty's kings created and re-constructed the three huge important ancient Khmer sanctuaries in Thailand. They were Phimai Sanctuary, Phnomwan Sanctuary in Nakorn rajasima and Phnomrung Sanctuary in Buriram³⁸.

The contemporary art before the Mahithonpula period (Around the first half of 6th century to the second half of 10th centuries A.D.)³⁹

1. The contemporary art of Phnom Da Style (c. 514-c.539). There is no trace of its architecture, but some important sculptures in Thailand were found in Phetchaboon province such as the first Hindu sculptures of Sri-Tep (See Figure 16).

³⁶ H.S.H Prince Subhadradis Disku, *Sinlapa Nai Prathet Thai (Thai arts)* (Bangkok: Amarin Publisher, 1979), 20-26.

³⁷ Charuwan Phungtian, "Thai-Cambodian Culture Relationship through Arts" (PhD's Thesis, Mahachulalongkornrajavidyalaya University, 2002) : 71.

³⁸ Phungtian, "Thai-Cambodian Culture Relationship through Arts."

³⁹ Disku, *Sinlapa Nai Prathet Thai (Thai arts)*, 50-51

2. The contemporary art of Sombor Prei Kuk Style (c. 617-c.637). The art style was similar to the model in Cambodia. The importance of Sombor Prei Kuk arts style was found in the lintel at Supatnaram Temple in Ubon rajathani.

3. The contemporary art of Prei Kmeng style (c. 638-c.681). The Prei Kmeng art style in Thailand are similar to the Prei Kmeng in Cambodia. The most important sanctuary in Thailand that is of the Prei Kmeng style is Phom Pon Sanctuary in Surin province.

4. The contemporary art of Preah Ko style (c. 877-c.886). There are the lintel of the brick building at Phnom Wan, Nakornrachasima province that are shown in the Preah Ko style.

5. The contemporary art of Bakheng style (c. 889-c.923). The main architectural decorations that are related to Bakheng style was a lintel in Phnomwan Sanctuary, Nakornrachasima Province.

6. The contemporary art of Koh Ker style (c. 921-c.944). . The most important sanctuary in Thailand that is of the Koh Ker style is Phom Rung Sanctuary in Burirum province.

7. The contemporary art of Pre Rup style (c. 944-c.968). There are important architectures is "Prang Keak" or "Devalai" in the middle of the Loburi Town that show the Pre Rup style.

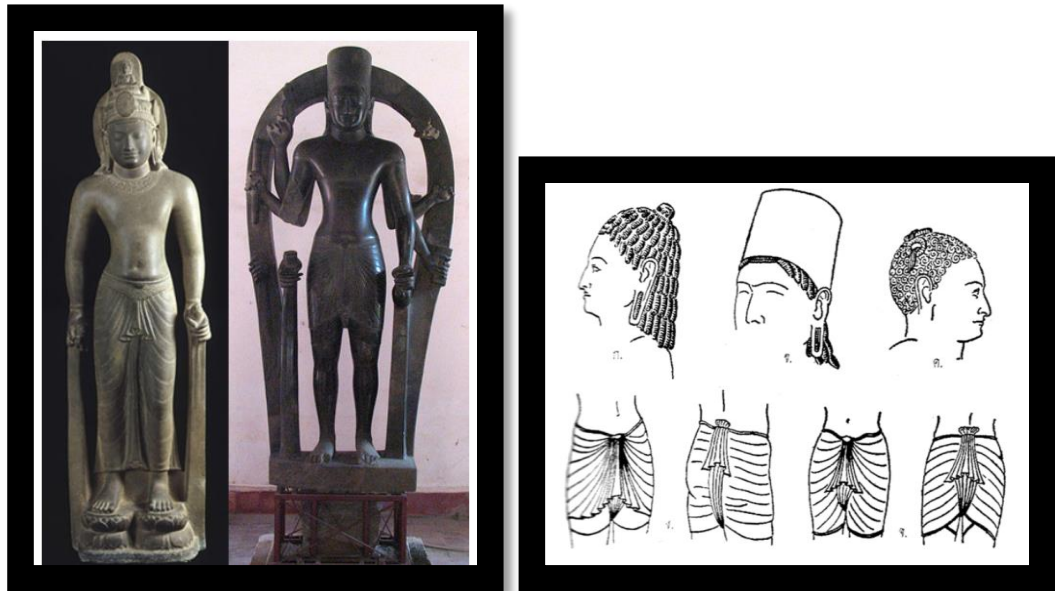


Figure 16: Phnom Da Style (514-600), Sculpture: Evolution of statuary from high relief to free-standing sculpture. The works display typical Indian movement of the torso, often with a support arch to provide stability.

Source: <http://www.tevoda.com/khmerart.html>

The contemporary art the Mahithonpula period. (Around the first half of

11th century to the second half of 11th century)⁴⁰

1. The contemporary art of Baphuon style (c.1050-c.1080). It is the beginning of the reign of Jayavarman, the founder of Mahithonpula dynasty in northeastern Thailand.

The important sanctuary in this period in Thailand is Muang Tam in Buriram province (See Figure 17).

2. The contemporary art of Angkor Wat style c.1080-c.1175). An important sanctuary decoration art was the principle tower at Phimai sanctuary in Nakornrachasima (See Figure 18).

⁴⁰ Diskul, *Sinlapa Nai Prathet Thai (Thai arts)*, 61-67.

3. The contemporary art of Bayon style c.1181-c.1243. Most of the Khmer arts and architectures in Thailand are influenced by the Bayon Style. There are many buildings and sculptures of the Bayon style throughout Thailand. The most important sanctuary is Prang Hin Dang at Phimai Sanctuary area, Nakornrachasima and the library of Phnom Rung sanctuary at Burirum (See Figure 19).

Besides these sanctuaries, there are the ancient architectures named "Dharmasala", the Khmer ancient building for teaching the Dharma. Another building is the hospital named "Arogayasala," the ancient Khmer traditional hospital. These architectural buildings are located throughout Northeastern Thailand.⁴¹

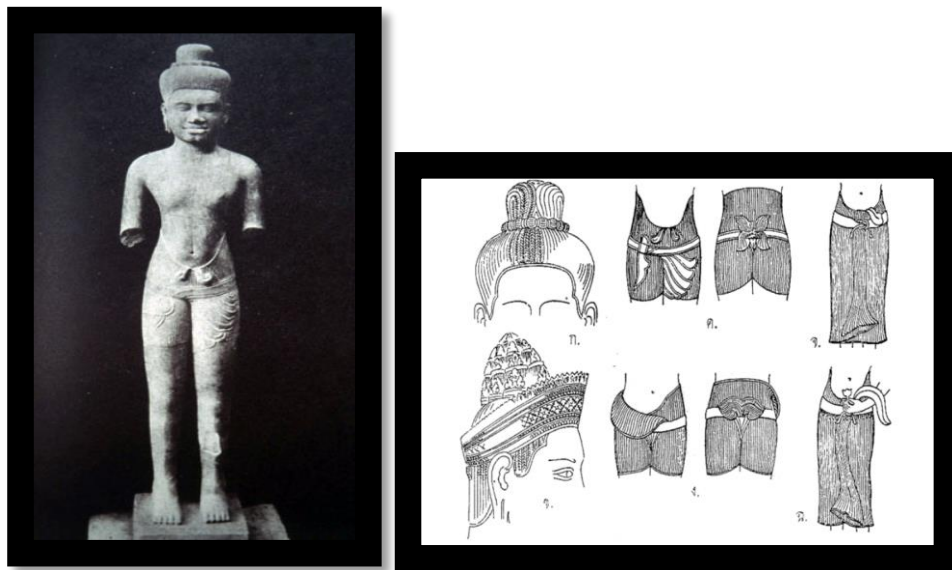


Figure 17: Baphuon Style (1010-1080), Sculpture: This style is deeply innovative, harmony and search for perfection are its fundamental characteristics. Shapes are elegant and fluid, the expressions of faces soft, yet inner strength and natural forms are evident. Decoration and figurative ornamentation are abundant, every available space is sculpted. Source: <http://www.tevoda.com/khmerart.html>

⁴¹ Phungtian, "Thai-Cambodian Culture Relationship through Arts."

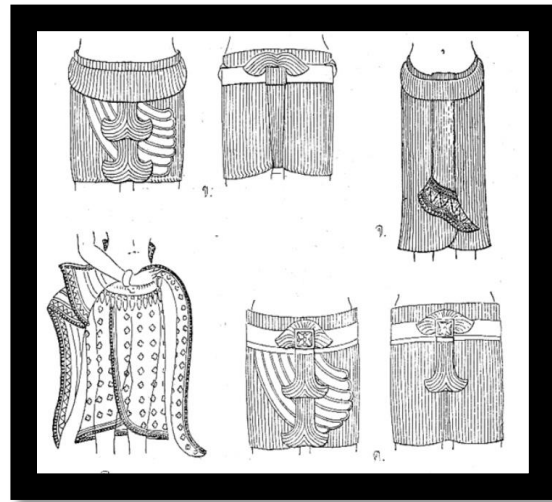
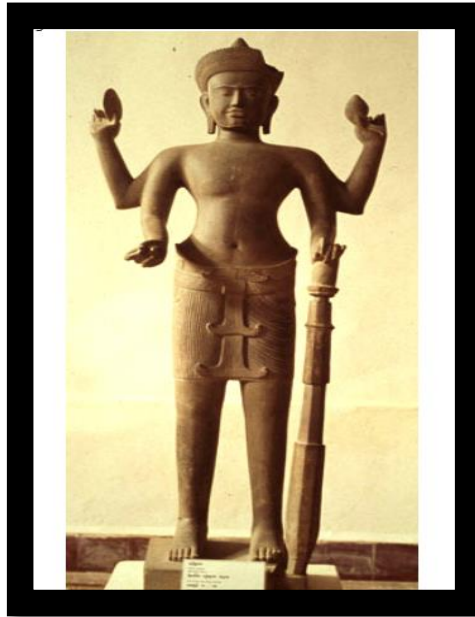


Figure 18: Angkor Wat Style (1100-1175), Sculpture: This style corresponds to the apogee of the classical age, it extends the Baphuon style: harmony, perfect mastery of materials, equilibrium, perspective science, quality of decoration and composition. Use of previous architectural elements continues in a multiple and varied way, leading to a new symbolic and functional significance.
Source:<http://www.tevoda.com/khmerart.html>

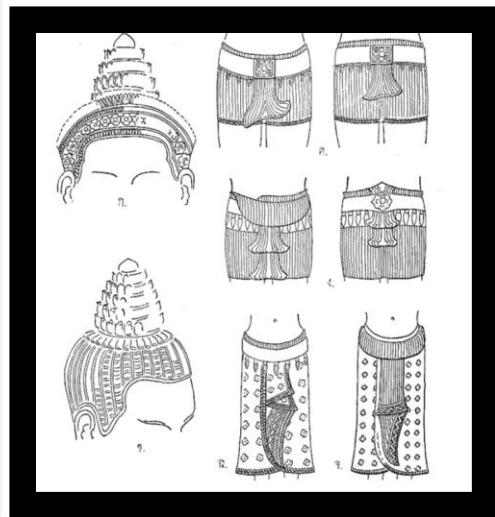


Figure 19: Bayon Style (1180-1230). Buddhist art is at its height, and Buddhist themes prevail, though Hindu legends are still represented. This style is monumental, aesthetics shows a clear return to realism. Religion: Buddhist preponderance (Mahayana). Sculpture: Iconography is more varied, symbolism gains in importance and the first scenes of contemporary daily life appear. Towards the end of the 12th century, Khmer art also produce portraiture. This fragment of a statue (left) is thought to be an image of King Jayavarman VII. The Phimai Sanctuary of Phimai Town is using many of the art decoration in Bayon Style.
Source:<http://www.tevoda.com/khmerart.html>

Chapter 2

History and Development of Phimai Town, Nakhon Ratchasima

History and Development of Phimai Town

In the previous chapter, the historical development of Khmer Empire, I attempted to understand the structure of the Khmer Empire, which has the most influence on Phimai Town in the aspects of historical architecture, sculpture, intricate irrigation systems, and roads. This chapter will focus on the historical development of the Phimai Town and how it developed into the Town as it is today.

2.1 Development of settlement in Northeast Thailand

The term Isan has been referenced to the "Northeast" in the Thai language (See Figure 20). Comparing to the other parts of Thailand, the Northeast shows most of the evidence and traces of ancient human settlement. Archaeological evidences were found in northeast, such as iron and bronze tools, jewelry, painting, and carved arts on stones. Those evidence show that northeastern Thailand was the first region that transited from a stone era to a bronze era⁴². The region was under the influence of the Dvaravati culture, and followed by the Khmer empire. The Khmer empire built dozens of sanctuaries throughout the region. It was the location of the most important Khmer sanctuaries in Thailand, such as Phimai and Phanom Rung sanctuary.

Pre-Historical Period

The first human settlement in the area can be traced back 5,600- 12,000 years. There are evidence of archeological digs and carbon dating of relics excavated there. According to the study of archeologists, there were no trace of architectural settlement in this period. The settlers survived by hunting and collecting plants. After 5,000 years later, there were a traced of

⁴² Prof. Chumphon WichianSin, "Phumsat Isan (The Northeast Thailand Geography)" Paper teaching Report at University of Khon Kaen, Khon Kaen, Thailand, 1981.

agriculture in the area by the Mekong River.⁴³ The development of civilization started nearby the area of Mekong River. Most of the archeological sites in present times were found along the Mekong River. In 150- 550 C.E., Mekong was likely inhabited by the empire of Funan and later Chenla. Archaeological evidences show important trading ports and canals as early as the first century CE and extensive human settlement in the region.⁴⁴



Figure 20: Map of Northeast, Thailand (Issan).Date: 2013
Source: http://en.wikipedia.org/wiki/File:Thailand_Isan.png

⁴³ Miriam T. Stark, "Pre-Angkorian settlement trends in Cambodia's Mekong Delta; and the lower Mekong archaeological project," *Indo-Pacific Prehistory Association Bulletin*, (2006): 99.

⁴⁴ "Northeast Thailand Kingdom and Empires," Thailand's Word, accessed September 3, 2013, <http://www.thailandsworld.com/en/thailand-history/northeast-thailand-history/northeast-thailand-kingdoms--empires/index.cfm>.

Following the kingdom of Funan and Chenla (See Figure 21), the region was continuously populated by Thailand-Dvaravati (See Figure 22). The Mon Dvaravati Kingdom is a distribution of Mon settlements or independent urban communities without the administrative system.⁴⁵ Archaeologists believe that the Dvaravati culture developed from pre-historic times. The cities were circular, surrounded by two moats and earthen embankment.⁴⁶ The design of the moats were with purpose of storing water. Most cities were located nearby the river basins and easy to water access and transport. The size of the cities were large. The arts and architectural style are terra-cotta modeling, stucco relief sculpture, and Buddhist statuary in bronze and stone. Few records have survived that Dvaravati culture expanded into Isan as well. The Dvaravati period came to an end when the Khmer Empire raised to Angkor period in the 11th century. Dvaravati began to come under the influence of the Khmer Empire by the Khmer King, Suryavarman II and followed by Jayavarman VII (See Figure 23).⁴⁷

⁴⁵ B. Bhumadhon, *The History of Lopburi during the Dvaravati Period*. Bangkok (Bangkok, Thailand: Krung Siam Press, 1983), 105-120.

⁴⁶ Witthaya Raksa Company, "Phaen Chatkan Anurak Lae Praprunng Saphapwaetlom Mueang Kao Phimai(Development and Perservation of Phaimai Town)" (proposal to science ministry and the environment of Thailand, Bangkok, Thailand, 1998).

⁴⁷ B. Bhumadhon, *The History of Lopburi during the Dvaravati Period*. Bangkok (Bangkok, Thailand: Krung Siam Press, 1983), 98-100.

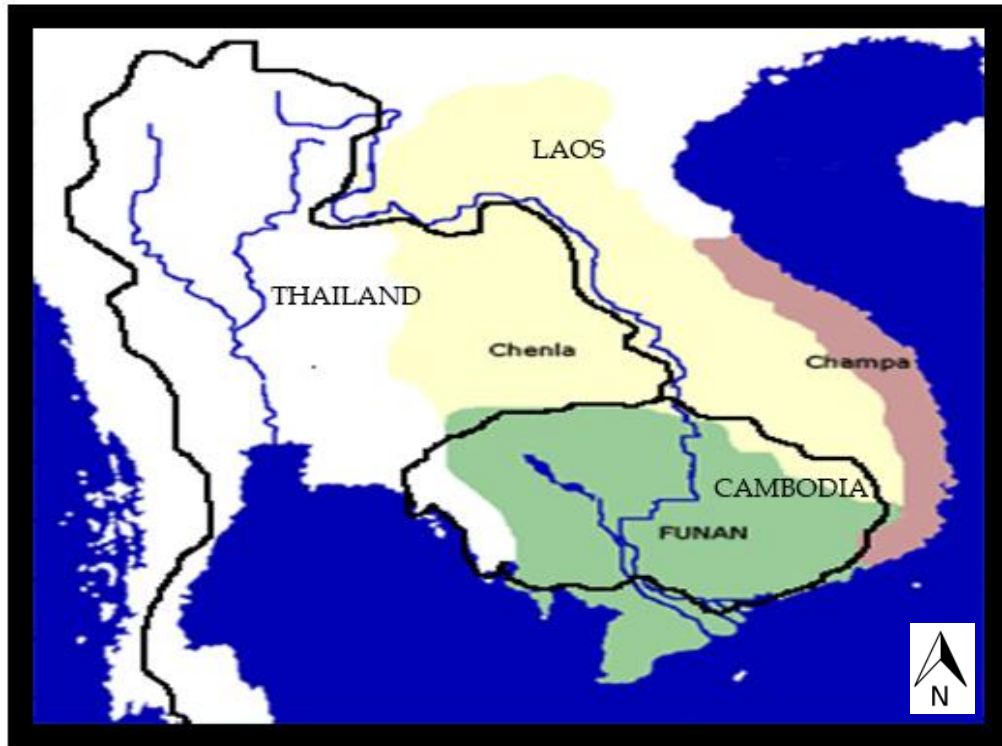


Figure 21: Territory of Funan and Chenla in Northeast Thailand in 5th Century

Source:<http://www.chinahistoryforum.com/index.php?/topic/36069-are-vietnamese-chinese/page-14>

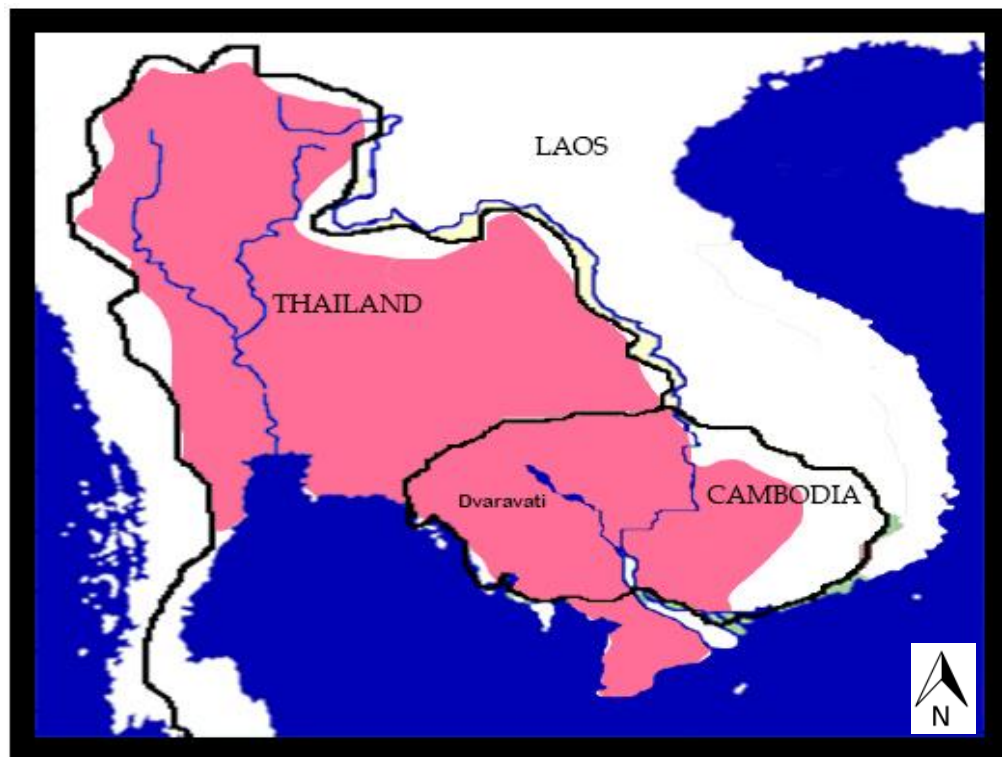


Figure 22: Territory of Dvaravati in Northeast Thailand from the 6th to the 11th centuries.

Source:<http://en.wikipedia.org/wiki/File:DvaravatiMapThailand.png>

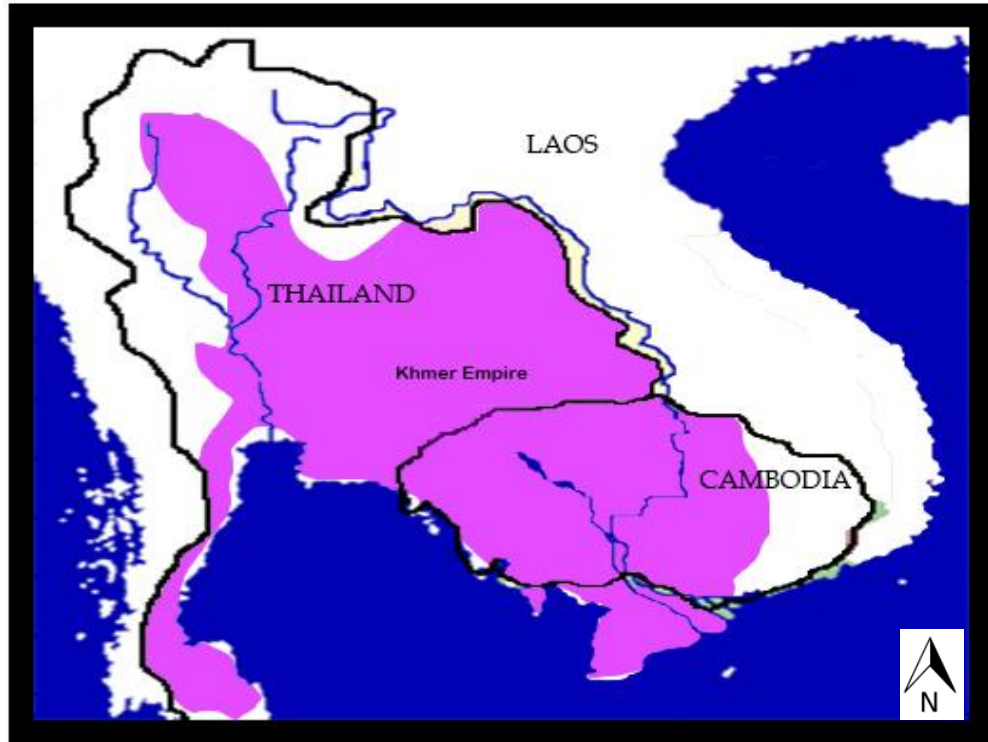


Figure 23: Territory of Khmer Empire in Northeast, Thailand in 13th century.
Source:<http://thailandsworld.com/>

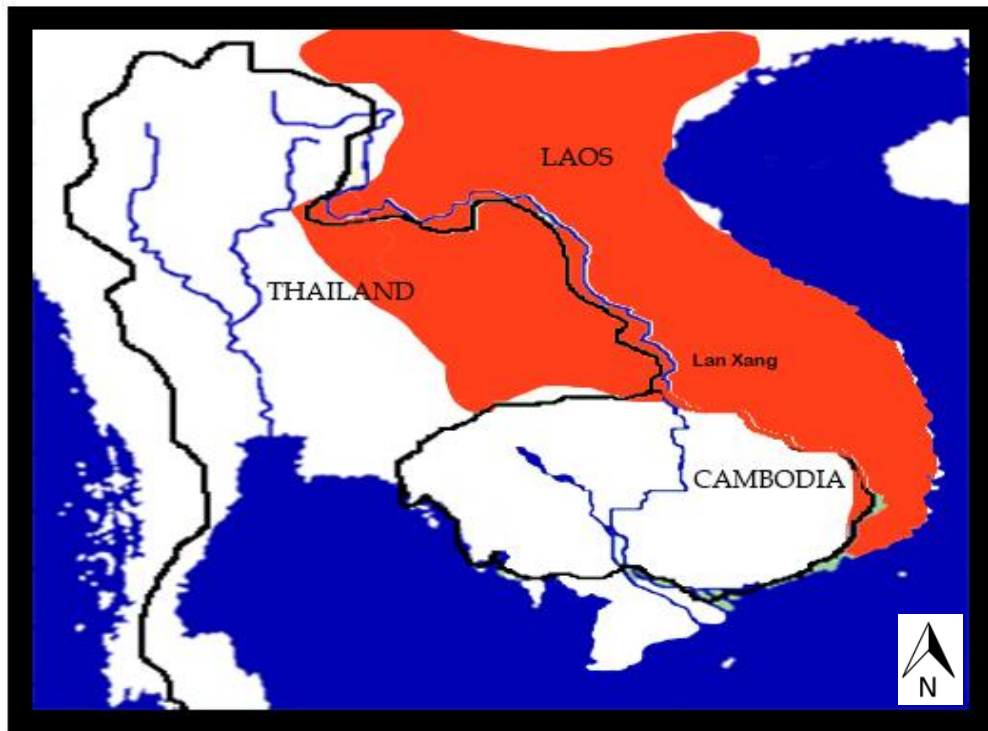


Figure 24: Territory of Lan Xang in Northeast, Thailand in 16th century.
Source:<http://www.bukisa.com/articles>

Under the Khmer Empire's influence, the urban settlements along the area of Mekong River were changed from "Unplanned" to "Planned". Unplanned refers to the cities as cluster, and planned as the think-through layout urban planning⁴⁸. Urban planning in the cities started to take form of the rectangles or squares. The construction of sanctuaries, canal, and large reservoirs (Barays) provided a visible influence from the Khmer Empire in the area.⁴⁹ In the 13th century, the Khmer empire began to decline, Isan was dominated by Tai-Lao Kingdom of Lan Chang (See Figure 24), which was conquered by King Fa Ngum. King Fa Ngum organized conquered principalities into "Mueang", the semi-independent city state. The kingdom of Lan Xang extended from the boarder of the Dai Vietnamese boarder to the West of the Khorat Plateau or Nakhon Ratchasima as in the present day.

Later on Lan Chang and Ayuthaya were merged together to prevent confrontation between the two kingdoms. All of the Khorat Plateau became recognized as the Thai (Siamese) boundary region. In the early 16th century, Ayuthaya became the most powerful. The Thai expanded the power into the Northeast more than in the past. The Northeastern areas became a region of important to three Kingdoms; Ayuthaya, Champasak, and Vientiane.⁵⁰ In 1767, Burmese troops destroyed Ayuthaya. Vientiane was forced to join Burma. At the same time, Champasak attempted to expand its territories into the Northeast. The Burmese occupied Thailand for a short period and were driven out of the country by General Phraya Taksin. The General Phraya Taksin established a new Thai capital at Thonburi and became a new king. Since

⁴⁸ Walter Jamieson, and Pawinee Sunalai, "The Management of Urban Tourism Destination: The Cases of Klong Khwang and Phimai, Thailand," *UMP-Asia Occasional* (2002): 13.

⁴⁹ Michael E. Smith, "Form and Meaning in the Earliest Cities: A New Approach to Ancient Urban Planning," *Journal of Planning history* (February 2007): 35-47.

⁵⁰ "Thai Politics and Foreign Aid in rural Isan development and Modernization in 1990's," accessed October 16, 2013, http://www-rci.rutgers.edu/~karnchan/thai_isa.txt.

that time the Northeast, or Khorat Plateau still remained an outer region within the Thai Kingdom.⁵¹

The new Chakkri dynasty, ruled by King Rama I, moved the new capital from Thonburi, which was on the left bank of the Chao Phraya River, to Bangkok as in the present. The expansion of Thailand were farther into the Northeast, including Laos as in present days. With the nineteenth century, the European colonial powers became strong and powerful. "The Franco-Siamese Treaty of 1893" allowed the French and British to expand their territories into Southeast Asia, thus halting the Thai expansion. Because of "The Franco-Siamese Treaty" the borders of Thailand were established. This treaty also took over the entire area on the left bank of the Mekong River, which is Laos today, for France. Since that time the present border between Laos and Thailand has not been changed.⁵²

In the mid-20th Century, Thai Government promoted Isan as an integral part of Thailand and de-emphasized the Laos and Khmer ethnicities under Thai nationalist policy.

⁵¹ "Thai Politics and Foreign Aid in rural Isan development and Modernization in 1990's." accessed October 16, 2013, http://www-rci.rutgers.edu/~karnchan/thai_isa.txt.

⁵² "Thai Politics and Foreign Aid in rural Isan development and Modernization in 1990's." accessed October 17, 2013, http://www-rci.rutgers.edu/~karnchan/thai_isa.txt.

2.2 History and Development in Phimai Town

Phimai Town was a town in the old days but is now only an amphur (district), 56 Km north-east of the town of Nagara Rajasima, Thailand (See Figure 25). Phimai was an ancient Khmer city named Vimai or Vimayapura. A stone pillar dating to the reign of King Suryavarman I was found, naming the city Bhirapura meaning strong city. Phimai was an important city ever since, both during Ayutthaya and Rattanakosin times. Phimai town district was officially established in 1900. Khun Khachit Sarakam (ขุนขจิตสารกรรม) was the first governor⁵³. The town was a center trade gateway from the Moon River basin to Cambodia and to the towns along the Chao Phraya River basin. Phimai Town is the home of the amazing 900 years-old Phimai Historical Park, perhaps the most important Khmer Historical site in Thailand. The Phimai Historical Park, a religious sanctuary of Mahayana Buddhists, is one of the biggest and most important religious sanctuaries found in Thailand. It was built around the 11th-12th century of the Common Era (C.E). "Phimai" is probably derived from the term "Vinaya," literally meaning "leading out" or "education," the latter appears in the inscription on the door frame of the southern entrance of the inner wall. It is believed that Phimai is an ancient town that has existed since the time of the Khmer Empire, and its sovereign community has developed progressively since then. The origin of Mahayana Buddhism at Phimai and its presence at a major Khmer temple of the beginning of the 12th century was unusual.⁵⁴ In Cambodia at this time, the principal religion was still Hinduism, but in the Khorat Plateau, the Khmer form of Mahayana Buddhism had been well-established since the 7th century. Phimai Historical Park is one of the most important Mahayana Buddhist temples in Thailand.⁵⁵

⁵³ PhonKoet, *Prasat Hin Phimai*, 27.

⁵⁴ Michael Freeman, *Phimai: Prasat Phiman* (Bangkok, Thailand: Amarin Printing and Publishing, 1998), 25-30.

⁵⁵ Chutinan, "Cultural Heritage, Interpretation, Management and Promotion; Phimai Historical park."

Phimai Town is dominated by the park, an area of 1,000 meter by 500 meter walled. The Phimai Historical Park is located right in the center of town. Some traces of the eastern rampart still exist as well as three sandstone gates on the north, west, and south, the latter being named Pratu Chai (Victory Gate). Phimai Historical Park plan followed the plan of Angkor Wat. The plan of the township was in the shape of a rectangle enclosed on all sides by moats and surrounding walls, of which traces still remain. Of the four walls, the front side of the ancient town stood, as the Temple itself, facing Southeast in the direction of Angkor (See Figure 26).⁵⁶ The fact that the temple of Phimai faces South in the direction of Angkor instead of facing east, which is uncommon from other Khmer temples, is significant; however, the reason is still unknown. Some Scholars said that it might have been by design to give effect to the special position and importance related to the relationship to Angkor, as made evident later by the command of King Jayavaraman VII to build rest houses and hospitals on the cultural route to Phimai.⁵⁷ The pride of place within stands Phimai sanctuary, a 28 meter high tower that really has been well preserved, with intricate carvings of Hindu gods and scenes.

⁵⁶ Thanongsak Hanwong, *Mueang Phimai (Phimai Town)* (Bangkok, Thailand: Cooperative Agriculture society of Thailand, 1989), 11-15.

⁵⁷ Dr. Adul Wichiencharoen, "Phimai, its Cultural Route and the Associated Temples of Phanomroong and Muangtam" (paper presented at the World Heritage Committee of Thailand Conferences report, Bangkok, Thailand, 2004).



Figure 25: Map of the Distance from Phimai Town to Bangkok, Thailand (2013).
Source:http://en.wikipedia.org/wiki/File:Thailand_location_map.svg

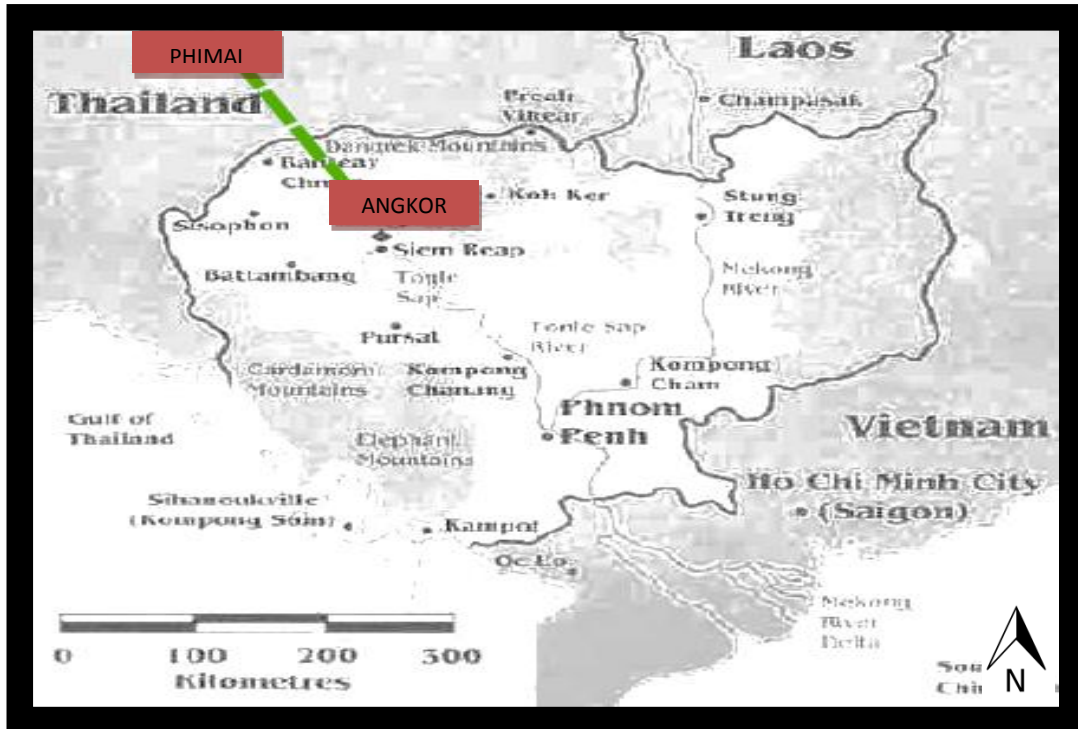


Figure 26: Map of the Distance from Phimai Town to Angkor, Cambodia. Date: 2013
Source: <http://www.appletravel.cn/files/holiday/Siemreap%20and%20Angkor.jpg>

The first inventory of the ruins was done in 1901 by the French geographer Etienne Aymonier. They were put under governmental protection by announcement in the Government Gazette, Volume 53, section 34, from September 27, 1936. Most of the restorations were done from 1964 to 1969 as a joint Thai-French project. The historical park, now managed by the Fine Arts Department, was officially opened by Princess Maha Chakri Sirindhorn on April 12, 1989. To visit Phimai Historical Park, visitors will start the tour of the heritage site through the Naga Bridge, and then southern gopura (door), then pass through the courtyard, and then the inner gallery into the principal tower which have Prang Brahmadat and Prang Hin Daeng on either side.⁵⁸

⁵⁸ Chutinan, "Cultural Heritage, Interpretation, Management and Promotion; Phimai Historical park."



Figure 27: Map of Phimai, Nakron Ratchasima, Thailand. Date: Unknown
Source: <http://www.bangkoksite.com/nakhonratchasima/PhimaiMap1HA.jpg>

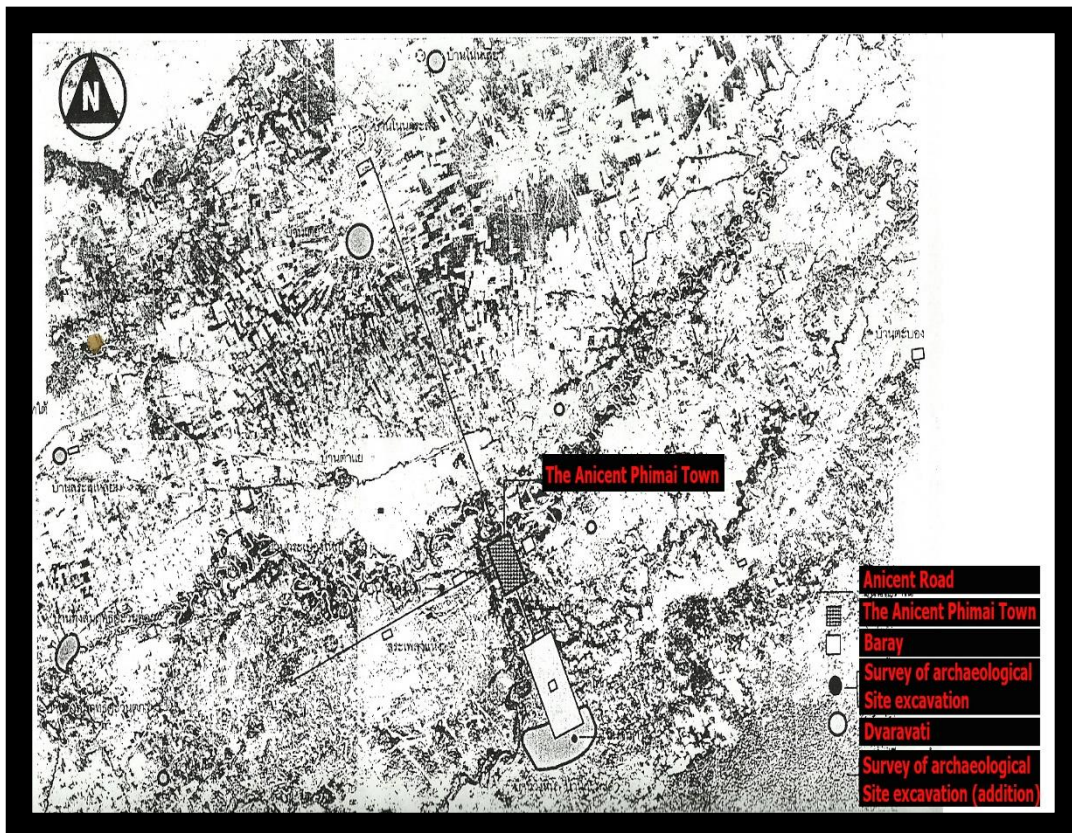


Figure 28: Map of Old Community of Phimai Town, Nakron Ratchasima, Thailand from 6th to the 11th centuries.
Source: *Book of Preservation and Development Phimai Town by the Fine Art Department of Thailand*

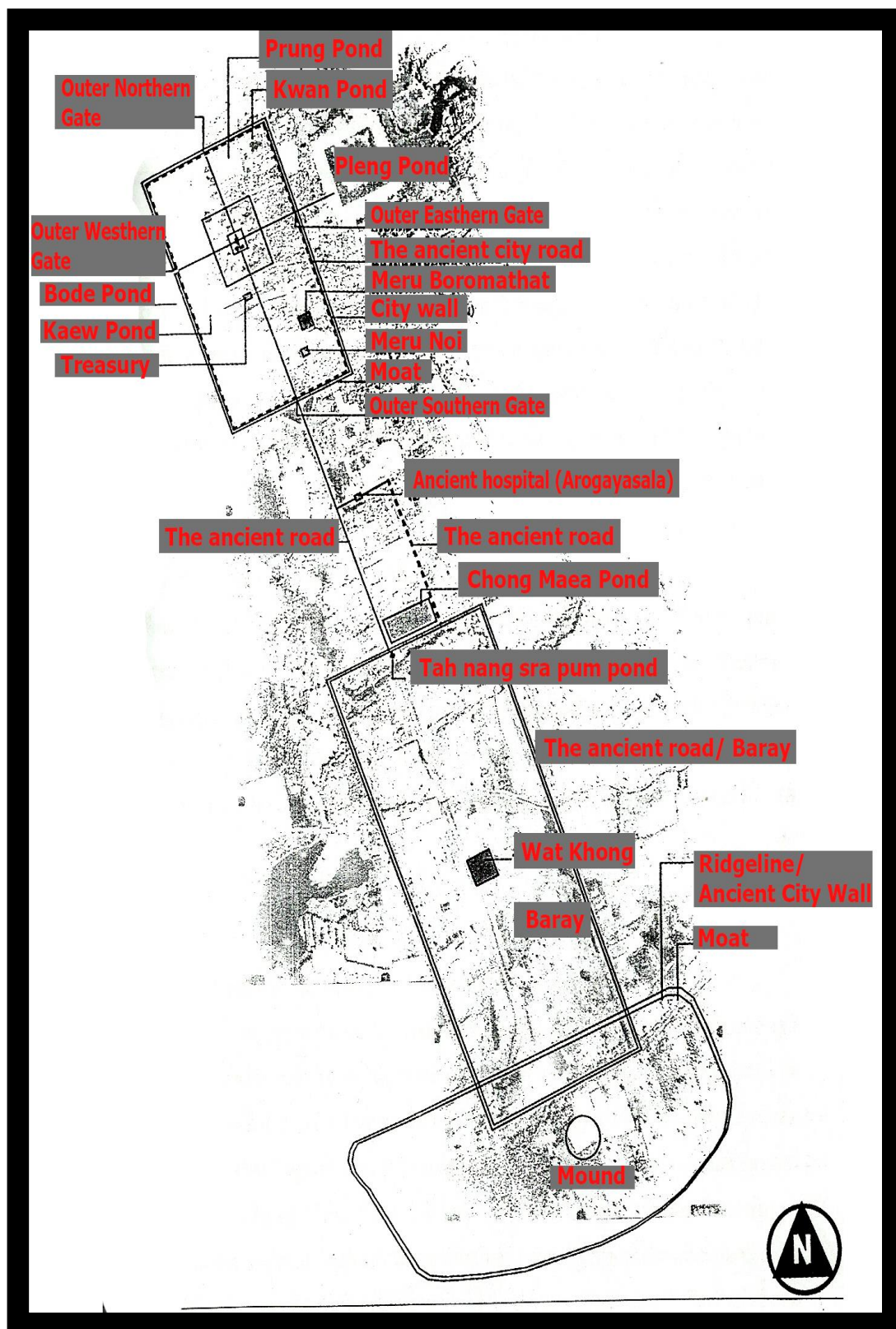


Figure 29: Map of Old Community of Phimai Town, Nakorn Ratchasima, Thailand, shown the boundary of The Phimai's Old Baray on the Southern of the Town. Date: 1999
Source: Olmtong Ektanitphong

2.3 Relationship between Neighbor Cities and Angkor Wat

To understand the relationship between Phimai Town, the neighboring cities, and the Angkor Wat, the study of the "Historic Royal Road Routes" needs to be researched. The Historic Royal Road Route spanning from Angkor Wat in Cambodia to the cities in Northeast Thailand (Isan) created an important Khmer sanctuaries in Thailand such as, Muang Tum Sanctuary in Buriram, Phanom Rung Sanctuary in Buriram, and Phimai Sanctuary in Nakhon Ratchasima. These sanctuaries were influenced by ancient Khmer urban planning in landscape elements, such as the water management system, the Baray, an ancient water reservoir.

2.3.1 The long lost Angkor-Phimai Royal Road

For centuries, the main function of most local roads is to get to and from residences. Roads reduce the distance between people, markets, services, and knowledge - or simply 'getting people connected'. The Khmer Empire is well known for its road system. A great priority of Khmer rulers and their greatest achievement was the network of roads fanning out from the capital. The royal road to Phimai almost certainly existed at the beginning of 12th century of the Khmer power. Then, Phimai was a major center, and the roads had both military and trade importance. According to Col. Surat Lertlumthis, leader of Chulachomklao Royal Military Academy, "The Angkor- Phimai Royal Road is where the ancient road, which passed through the plains in Cambodia, climbed up the mountainous forest of Phanom Dongrak to the plateau in Thailand before heading toward Phimai," The road started at the western gate of the Angkor Thom temple and ended at Phimai Town. The walking distance from Angkor to Phimai Town is 254-kilometre. Along the Angkor-Phimai Royal road there were constructions of arogyasalas (rest-house/hospital) for travelers (See Figure 30). There are seven arogyasalas discovered in

North-East Thailand. They are made of laterite with only the door and window-frames made of sandstone. The construction size is small, approximately 4 by 15 meters (See Figure 31). The distance between each arogyasalas is a one day walking distance. Today only two of the arogyasalas have been renovated at the location of Prasat Ta Muan and Prasat Hin Phimai. The rest are still in a ruined state. The arogyasalas at Prasat Hin Phimai is located along the road from Phimai Town to Phimai's Old Baray. The Angkor-Phimai Royal Road is a major evidence of the relationship between Phimai Town and Angkor City.

2.3.2 Urban Planning: Water Management System Baray

Phimai Town and its neighbor cities were where Khmer Sanctuaries in Thailand influenced by Angkor City urban planning were located. The Angkor City and Southeast Asian urban planning are based upon the cultivation of rice, either in dry fields or in wet paddies. Rice cultivation has influenced both the pattern of settlement and the arrangement of the land.⁵⁹ An inscription dated to 922 CE confirmed the existence of centralized system of taxation involving chiefly agricultural produce that operated through the local sanctuary.⁶⁰ The sanctuaries played a big role in the agricultural culture in Khmer Empire. The ancient urban planning of the Khmer sanctuaries have to design the landscape to support the agriculture, the water management system was especially important. The city of Phimai Town and Its neighboring cities, such as Phnom Rung Sancturay and Angkor Wat show that water is the major element in the ancient Khmer urban planning design (See Figure 32, 33, 34). Angkor was the sites to take advantage of natural resources in the area, particularly the water and food from the river. Angkor City was

⁵⁹ Chit PhumSak, *Tamnan Haeng Nakhonwat (The tale of Angkor Wat)* (Bangkok: Charoen Wit Publisher, 1981), 69.

⁶⁰ Mitch Hendrickson, "Historic routes to Angkor: development of the Khmer road system (ninth to thirteenth centuries AD) in mainland Southeast Asia." *Antiquity journal* 84 (2010): 492.

laid out on a rectangular-based grid system. Even natural landscape features such as river Siem Reap, were redirected to meet the urban grid.⁶¹ The palace and the sanctuary was located in the center of the city with enclosed wall on all four sides.

The waterways is an important component of the Khmer city plan. Water provided the Khmer people with drinking, irrigation, bathing, and transportation. Water channeled from the rivers and canals was linked to the architectonic water reservoir, Baray. The Baray covered approximately hundreds of acres land. It held thousands of acre-feet of water to support agriculture, irrigation, and religious ceremony. According to some scholar, Barays were also used as fish tanks and waterfowl ponds. The reason was to double a food and water source in the dry season.⁶² City plan of Phimai Town, Phanom Rung Sancturay and Angkor Wat show that Barays' size are mostly bigger size then the city for sufficient supplies.

⁶¹ Thida Saraya, *Mueang Prawattisat Phimai (Ancient City of Phimai)* (Bangkok: Dansuttha Publisher, 1995), 12-16.

⁶² Marcia Anderson, "Angkor Wat and Southeast Asia Land Use" (PowerPoint presented at Science Supercourse, 09 Apr, 2010).



Figure 30: The Angkor-Phimai Royal Road route with the location arogyasalas along the road

Source: <http://www.sundial.thai-isan-lao.com/dharmasalaroute.html>



Figure 31: the arogyasalas have been renovate at the location of Prasat Ta Muan

Source: <http://www.sundial.thai-isan-lao.com/dharmasalaroute.html>

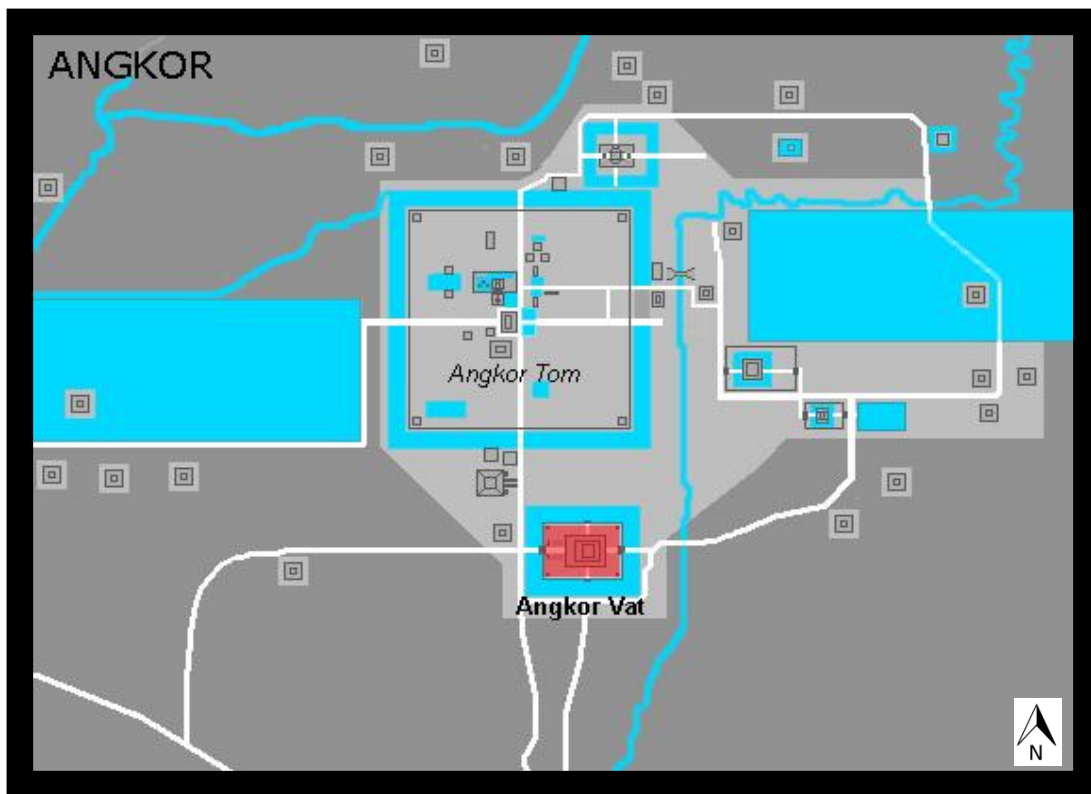


Figure 32: Master Plan of Angkor Wat City, Cambodia shown the water Channels and Water Reservoir, Baray. Date 2013.

Source: Olmtong Ektanitphong

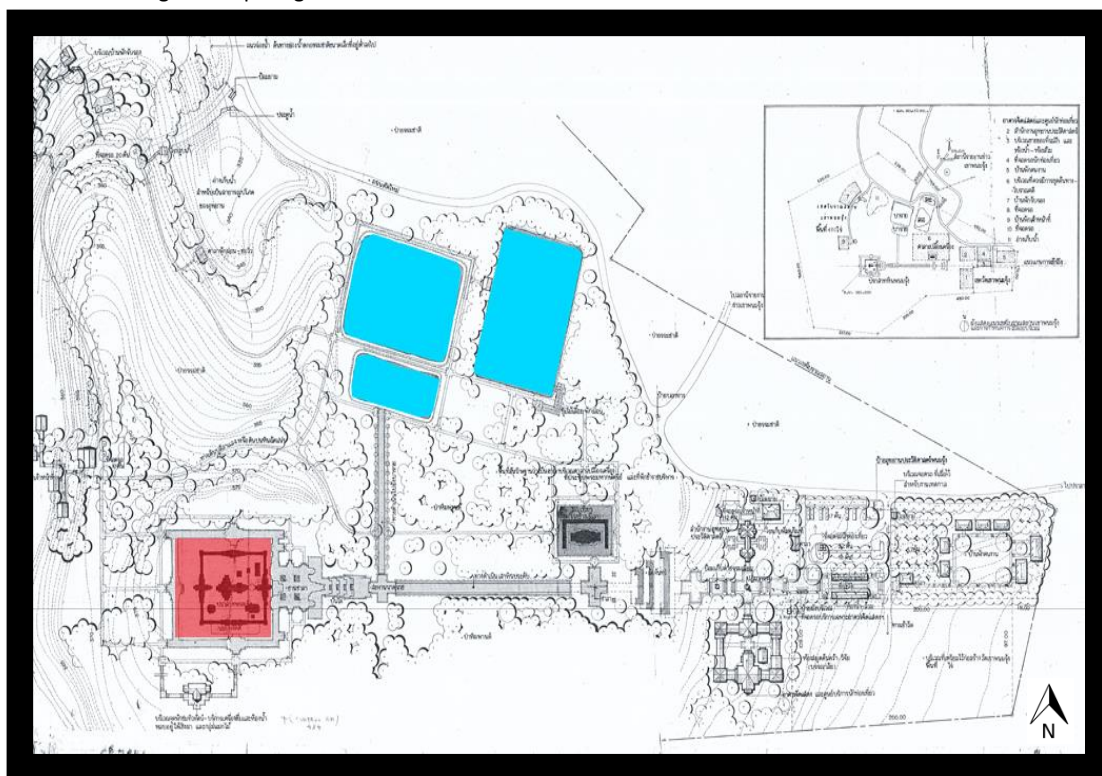


Figure 33: Master Plan of , Phanom Rung Sancturay , Burirum, Thailand shown the Water Channels and Water Reservoir, Baray. Date 2013.

Source: Olmtong Ektanitphong

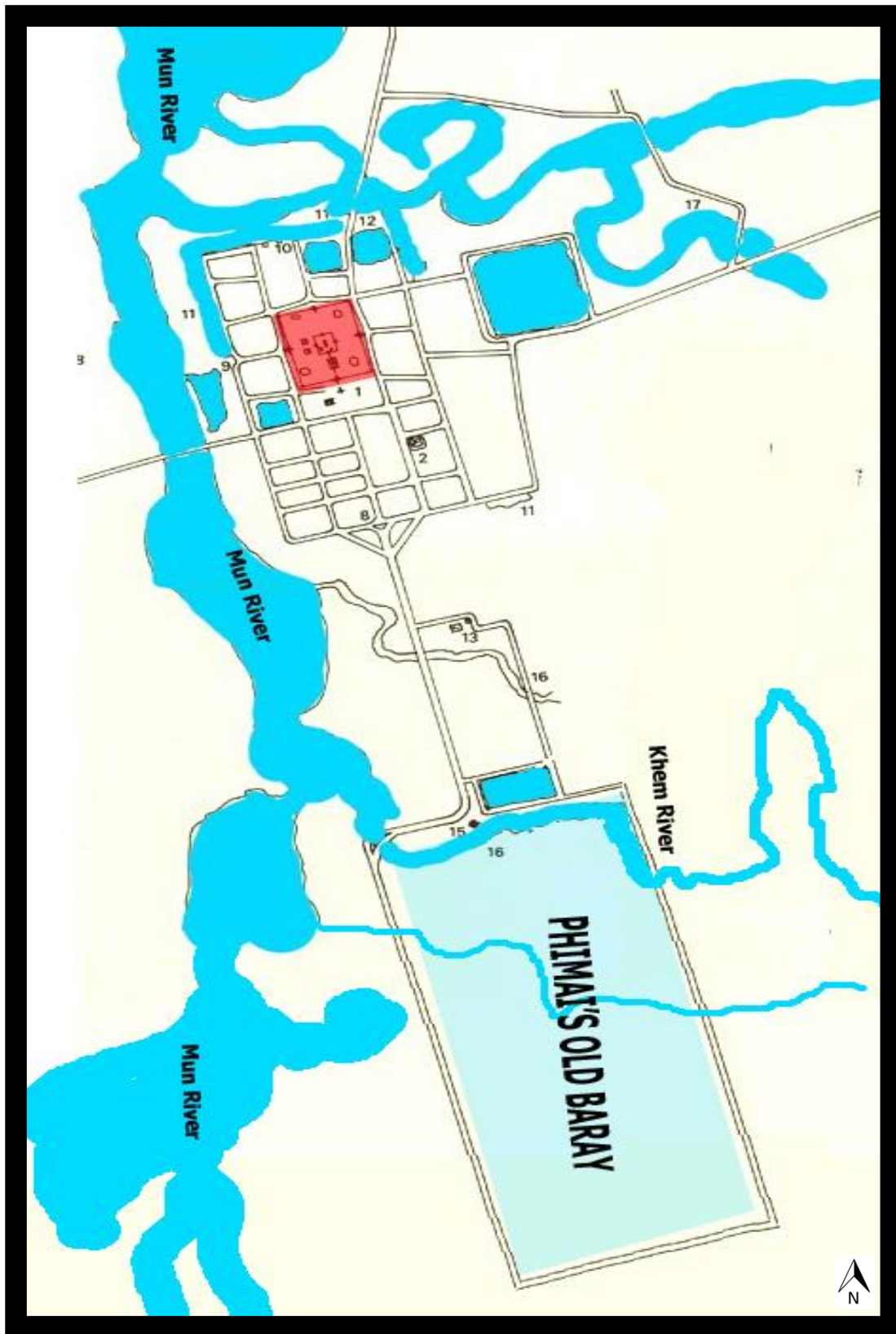


Figure 34: Master Plan of Phimai Town, Nakhon Ratchasima, Thailand shown the Water Channels and Water Reservoir, Baray. Date 2013.
Source: Olmtong Ektanitphong

Chapter 3

Present Phimai Town and Its Regions

Present Phimai Town and Its Regions

3.1 Location

Phimai, Thailand is located at 15.2232 in the latitude and 102.495 in longitude at an elevation/altitude of meters.⁶³ The average elevation of Phimai, Thailand is 157 meters. The town is the administrative center of the Phimai district. Phimai is aligned with the location of Angkor as shown in the following map (See Figure 35):



Figure 35: Map of Air SAR: showing the relationship of Phimai Town and Angkor. Date: Unknown
Source: <http://www.gisdevelopment.net/application/archaeology/general/archg0016pf.htm>

3.2 Topography

The Topography of Phimai Town and the surrounding area are located by the bank of the river. There are two main rivers that pass through the town; The Mun River, located on the East and, The Khmer River, located on the south, which it is a semi-recent alluvium. The

⁶³ "Population of Phimai, Thailand," last modified January 16, 2012,
<http://population.mongabay.com/population/thailand/1607716/phimai>.

topography of Phimai Town is suitable to do many great agricultures such as rice, cassava, corn, and beans.⁶⁴

3.3 Transportation

Phimai Town is easy to get to from Bangkok, Thailand by bus or car. There is currently no flight route to Phimai. Travelers may take buses at Nakhon Rathchasi (Korat) to get to Phimai Town. Buses between Phimai and Nakhon Rathchasi (Korat) depart every 30 minutes. The main Highways to Phimai Town are shown in Figure 36:⁶⁵ Today, the state Highway Number 206 is one of the most used transportation road to get to Phimai Town from Bangkok, Thailand. The State Highway Number 206 run from northeast through the town to the southwest at the Phimai's Old Baray.

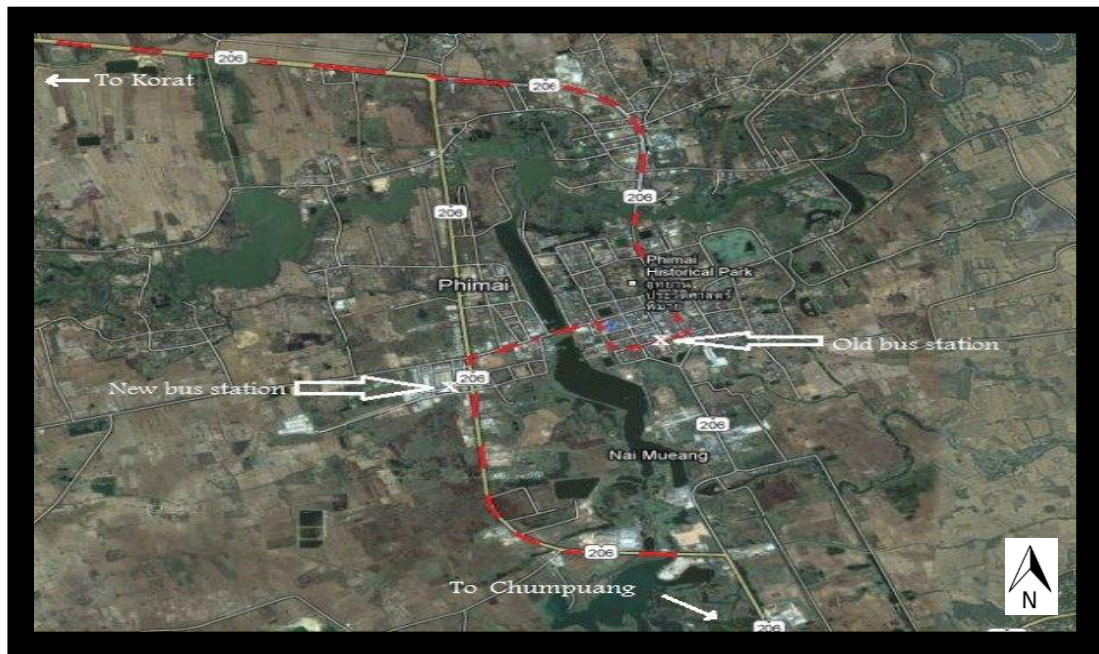


Figure 36: Map of the State Highway Number 206 passed Phimai Town. Date: 2013.

Source:<http://phimai.wordpress.com/2012/06/23/transport-getting-to-and-from-phimai-by-bus/>

⁶⁴ PhonKoet, *Prasat Hin Phimai*, 49.

⁶⁵ Witthaya Raksa Company, "Phaen Chatkan Anurak Lae Praprunng Saphapwaetlom Mueang Kao Phimai (Development and Perservation of Phaimai Town)" (proposal to science ministry and the environment of Thailand, Bangkok, Thailand, 1998).

3.4 Population

In 1997, the population in Phimai Town was 19,650 and 4,439 in the surrounding area. The population of Phimai Town increased every year from 1993 – 1997 by approximately 2.03 percent per year (See Figure 37). According to Town and Country Planning Department of Phimai, the population is expected to increase from 24,089 in 1997 to 31,600 in 2017⁶⁶.

Year	Population	Approximately increasing (percent/year)
1993	18,210	2.42
1994	19,057	4.65
1995	19,482	2.23
1996	19,512	0.15
1997	19,650	0.71
		Approximately 2.03

Figure 37: Table of population and increasing population in Phimai Town, Thailand

Source: *Book of Preservation and Development Phimai Town by the Fine Art Department of Thailand*

3.5 Economic

Most of the local income in Phimai Town is located in the business zone in front of the Phimai Historical Park. There are a total of 303 small businesses. Most of the businesses provide daily products and services as such, restaurants, coffee shop, local grocery stores, and souvenir shop that related to the Phimai Sanctuary. The expansion of these businesses grows rapidly due to the demands of tourists.⁶⁷ The industries in Phimai Town are located in the suburb area. There are around 25 big industries, most of them are farming industries. The reason that industries grow in Phimai Town and surrounding area is because of the state highway 206.

⁶⁶ Witthaya Raksa Company, "Phaen Chatkan Anurak Lae Praprunng Saphapwaetlom Mueang Kao Phimai (Development and Perservation of Phaimai Town)", 18.

⁶⁷ Witthaya Raksa Company, "Phaen Chatkan Anurak Lae Praprunng Saphapwaetlom Mueang Kao Phimai (Development and Perservation of Phaimai Town)", 20.

3.6 Traditional Festivals

The strength of tourism development of Phimai Town is the Phimai Historical Park, Khmer architecture and arts inside Phimai, which linked with the Khmer temple in Cambodia, national park, local culture and traditions that make Phimai Town different from the other town in Northeast, Thailand. Many annual traditional festivals attract tourists to Phimai Town. There are many of traditional festivals in Phimai such as the following:

The Phimai Festival have (See Figure 38) been held in Phimai Town in early November each year. According to vacation world website⁶⁸: "The event begins with a procession of people, dressed in traditional and ornate costume and accompanied by traditional music and dancing. From there, there are several things one can experience to learn more about Thailand's past and people. Several exhibitions are dedicated to the local culture and history. A market features people both making and selling local crafts - the most famous of these being Thai silk, which is world-renowned for its quality. When evening falls, the night is filled with extravagant dance performances designed to tell the story of King Jayavarman VII, all set to amazing and brilliant light and sound shows. These take place among the temple ruin complex, surrounded by the remains of fortresses and temples. A few more things that one might expect at Phimai Festival include a fireworks show, theater performances, booths everywhere serving regional food, cooking competitions to determine the best cooks of these foods and, almost as famous as the nighttime presentations, the longboat races. These races take place along the Mae Nam Mun River, pitting many boats, each with a crew of around 50 people, against each other to see which is the best."⁶⁹

⁶⁸ "The Phimai Festival," last modified October 26, 2012, <http://vacationworld.us/article/phimai-festival#sthash.HwcU4PPh.dpuf>.

⁶⁹ "The Phimai Festival," last modified October 26, 2012, <http://vacationworld.us/article/phimai-festival#sthash.HwcU4PPh.dpuf>.

Over a hundred years, thousands of people from Nakhon Ratchasima and nearby provinces live near the riverside, this is the same in Phimai Town. Mun River plays an important role in many of local festivals. The town of Phimai together with Tourist Authority of Thailand hosts the annual Phimai Boat Races to celebrate the region and its history. These longboat races take place in the Mun River, the Mekong River, and has been held at the same time as the Phimai Sanctuary Festival and the national festival of Loy Kratong, usually in late October or early November.⁷⁰ Long Boat-Racing Festivals (See Figure 39) are arranged every year by the end of the Thai Buddhist Lent Period on days that the river tide is highest. The festival lasts for four days. The highlight of the festival is the colorful decoration of longboat. This spectacular event draws thousands of visitors from all over the world, as well as the Thai's royal family⁷¹.

⁷⁰ "Phimai festival," Travel Isaan: The Ubon Ratchathani Experts, accessed November 10, 2013, <http://www.travelisaan.com/event/phimai-festival>.

⁷¹ Witthaya Raksa Company, "Phaen Chatkan Anurak Lae Praprunng Saphapwaetlom Mueang Kao Phimai (Development and Perservation of Phaimai Town)", 23.



Figure 38: Light and Sound, Dancing shows in Phimai Festival in front of Phimai Sanctury
Source: www.blogviajesyturismo.com



Figure 39: Phimai Boat Races Festival in Mun River every year in October or November
Source: www.baansaranya.com

3.7 Tourism

There are three main tourism attractions in Phimai Town and nearby areas:

Phimai National Museum

The Phimai National Museum (See Figure 40) is the center of cultural heritage in north-eastern Thailand. Most of the artifacts stored in the museum are from the lower Isan, such as Nakhon Ratchasima, Chaiyaphum, Buri Ran, Surin and Si Sa Ket. According to the Phimai National Museum, "The interesting art objects belong to Dvaravati and Khmer art styles. The Dvaravati style can be seen on Sima or boundary stone while the Khmer style is evident in stone carving of lintels, pendiments, pillars and antefixes. The master piece of the museum collection is the stone statue of King Jayavarman VII of Angkor Thom which was found in Prang Bhramadhatta, Prasat Phimai."⁷² The Phimai National Museum held the permanent exhibition, the museum office, auditorium, study collection, storage area, guest houses, and other facilities. Today there are not much visitors, but the promotion of the museum is in process.

Phimai Historical Park

The Phimai Historical Park is the main tourist attraction in Phimai Town. Many of the tourists, who visited Phimai Town came to visited Phimai Historical Park (See Figure 41). The Fine Arts Department of Thailand is responsible for managing the Phimai Historical Park. The Phimai Historical Park protects the most important Khmer Sanctuary in Thailand. The Phimai Sanctuary is rectangular in shape. It is 565 meter wide and 1,030 meters long. The special characteristic of the sanctuary is that it faces south while the other sanctuaries usually face east. There are speculations that it was built to face the ancient route that the Khmers traveled from

⁷² "Phimai National Museum," last modified January 2008, http://www.nationalmuseums.finearts.go.th/thaimuseum_eng/phimai/history.htm.

the capital of the empire, to the south of Phimai.⁷³ Within Phimai Historical Park are important structures such as, Naga Bridge, the bridge with lion figures standing in front of the main gate. There are the main pagodas, which are on an open area in a curved walkway. It is the center of the site and is made entirely of white sandstone. The pagoda is 28 meters high and has a square base, there are porticos, stairways, and doors in all four directions. The carving on the lintel above the four doorways of the main pagodas are the Baphoun style and the Angkor Wat style of Architecture and Khmer art. This leads to the belief that the main pagoda was built as an architecture model for a famous Angkor Wat.⁷⁴ There are two other pagodas in the Park, which are Prang Brahmadat in front of the main pagoda, and Prang Hin Daeng. The main source of income of the Phimai Historical Park is from selling the entrance ticket, souvenir, and books. Tourists who visit Phimai Historical Park include Thai visitors, foreign visitors, monks, students, and official guests.

⁷³ Maneerat Pachankoo, "Landscape Improvement Guidelines for Phimai Historical Park" (Master of Landscape Architectural Dissertation, University of Sinlapakon, 2010).

⁷⁴ Freeman, *Phimai: Prasat Phiman*, 40-54.



Figure 40: The Picture of the interior of Phimai National Museum.

Source: <http://www.asia-pictures.net/thailand/images/North-East%20Thailand/Phimai%20museum%20lentils%2020030114%20120420.jpg>



Figure 41: The Picture of the Phimai Historical Park.

Source: <http://1.bp.blogspot.com/-mLc2LlxAts0/U2mMI84Sx9I/AAAAAAAAZ4s/rM69XpNTWFI/s1600/7.JPG>

INCOME OF PHIMAI HISTORICAL PARK				
YEAR	THAI TOURIST	FOREIGN TOURIST	NET INCOME	BOOK SALES
2002	202,902	41,554	3,691,220	139,476
2003	200,394	34,100	3,367,940	349,271
2004	195,452	32,150	3,360,560	380,469
2005	192,150	28,150	3,047,500	289,225
2006	182,293	28,000	2,942,930	239,277
2007	116,500	32,600	2,937,000	243,795

Figure 42: Table income of Phimai Historical Park from 2002-2007

Source: "Cultural Heritage, Interpretation, Management and Promotion: Phimai Historical Park" By Sunanta Chutinan

YEAR	THAI VISITORS	FOREIGN VISITORS	MONK	STUDENTS	OFFICIAL GUEST	TOTAL
1999	202,007	37,192	10,277	56,911	31,488	337,875
2000	175,652	43,975	8,916	56,876	56,550	341,996
2001	171,004	46,915	8,256	62,293	36,529	324,997
2002	202,902	41,554	30,593	60,349	36,131	371,529
2003	200,394	34,100	4,825	31,019	60,988	331,326
2004	195,452	35,150	4,934	17,922	91,953	345,393
2005	170,400	24,450	4,454	61,801	11,946	273,051

Figure 43: Table Statistic of Tourist who visited Phimai Historical Park from 1999-2005

Source: "Cultural Heritage, Interpretation, Management and Promotion: Phimai Historical Park" By Sunanta Chutinan

Sai Ngam (The Banyan Tree)

The Sai Ngam is one of the tourist attractions in Phimai Town. However, it is not located within the boundaries of Phimai Town, it is actually located northeast of the Town. The Sai Ngam is the largest of Banyan groves in Thailand (See Figure 44). Some of the Banyan trees in Sai Ngam are over 350 years old. The old trees spread out its roots and cover an area approximately 35,000 square feet. A collection of dirt and brick paths meander through woodland trees and surrounded by water on all sides. Sai Ngam is considered to be a sacred place by locals. Locals regularly offer incense sticks and colorful flower to a spirit house near Sai Ngam's original 350 years old trunk (See Figure 45). The reason is Banyan trees are important trees in southern Asian mythology and religion because the Buddha is believed to have become enlightened under a type of Banyan. In Hinduism, the Banyan is considered to be the resting place of the powerful god Krishna.⁷⁵ Today Sai Ngam is also becoming a tourist destination as a restaurant area, where tourists can relax, and enjoy the natural environment.

⁷⁵ David Luekens, October 25, 2012 (4:19 a.m.), "Thailand's largest banyan tree grove, at Phimai's Sai Ngam," *Travelfish blog* . November 12, 2012, <http://www.travelfish.org/blogs/thailand/2012/10/25/thailands-largest-banyan-tree-grove-at-phimais-sai-ngam>.



Figure 44: The Sai Ngam is the largest of banyan groves in Thailand. The tourism attraction around Phimai Town.

Source: <http://www.travelfish.org/blogs/thailand/2012/10/25/thailands-largest-banyan-tree-grove-at-phimais-sai-ngam/>



Figure 45: The Sai Ngam is considered as sacred place for locals.

Source: <http://www.travelfish.org/blogs/thailand/2012/10/25/thailands-largest-banyan-tree-grove-at-phimais-sai-ngam/>

3.8 Archaeological sites in Phimai Town

The analysis of the element and physical structures of Phimai town by mapping, aerial photographs, and site visits concludes that Phimai Town is one of the most important ancient town in Thailand. The Aerial Photographs show the route of ancient Khmer road from Phimai Town to Angkor Wat City. Along the roads are many sizes of the Barays. The discovery of the ancient Khmer roads within the Phimai town and the suburb area of the town indicated that Phimai Town is very valuable in Khmer culture over the time. There are many archeology sites and objects found within the town and suburb area such as the following (See Figure 51)⁷⁶:

1) Prasat Hin Phimai (Phimai Sanctuary) National Historical Park

Phasat Hin Phimai is one of the most important Mahayana religious sanctuaries. It is located in the center of ancient Phimai Town. It is one of the biggest Khmer sanctuaries in Thailand. Most of its structures are believed to be about a thousand years old and built by the people of Brahmanic culture. Its rectangular shape is 655 meters wide and 1,033 meters long. These buildings were built of brick, sandstone, or a combination of both. The basic structure is built from three to five-story surmounted by Buddhist statues, have a low base and their spires are not so tall. Phimai sanctuary is located on a high plain surrounded by three large canals. Today none of the scholars know who built Phimai, or why it was built at the particular site it occupies. However, one source declares that "It was built in the 12th century and some years before Angkor Wat." Monsieur H. Parmentier, the Angkorean expert, after a detailed study at Phimai

⁷⁶ Witthaya Raksa Company, "Phaen Chatkan Anurak Lae Praprunng Saphapwaetlom Mueang Kao Phimai (Development and Perservation of Phaimai Town)" (proposal to science ministry and the environment of Thailand, Bangkok, Thailand, 1998).

came to the conclusion that the temple was built in the reign of King Suriyavaraman (A.D. 1002-1049). He held that its architectural style closely resembled Angkorean buildings. Phimai sanctuary is oriented to the south. But the orientation is not to the south exactly, the axis points 20 degrees east of south. It may be that it was meant in order to face the direction of Angkor Wat.

2) Meru Bramathat

The Meru Bramathat (See Figure 46) is a brick chedi on a small hill on the main square of Phimai Town. It is not well preserved. It is believed that it is from Ayutthaya period. Its height is approximately 30 m. from the ground to the top. There was a story that it was built for cremation of the Bramathat king.



Figure 46: The Meru Bramathat is a brick chedi on a small hill on the main square of Phimai Town.
Source: <http://www.thailanddee.com/eng/see-visit-thailand/meru-bramathat-phimai-85>

3) Meru Noi

The Meru Noi is another brick chedi, but smaller than Meru Bramathat. It was constructed by laterite. It is believed that it was built for the cremation of the Bramathat King's Queen. Today, it was demolished because of the expansion of the roads.

4) Kwan Baray (Sra Kwan)

Kwan Baray is located northeast of the Phimai town. It is a medium sized Baray. Today it is located within the area of Phimai National Museum.

5) Prung Baray (Sra Prung)

Prung Baray is located northeast of the Phimai town. It is located on the western side of the Kwan Baray. It is a medium sized Baray. Today it is located within the areas of residential housing.

6) Kaew Baray (Sra Kaew)

Kaew Baray (See Figure 47) is located southwest of the Phimai National Park. It is a medium sized Baray. It is surrounded by residential housings. Some of the residents in the area used the Baray as a recreational ground.

7) Bode Baray (Sra Bode)

Bode Baray is located outside of the Phimai's Ancient city wall. It is a very small sized Baray. The characteristic that makes this Baray different from other Barays inside Phimai Town is the island in the middle of Baray.

8) Pleng Baray (Sra Pleng)

Pleng Baray is located outside of the Phimai's Ancient city wall to the east. It is the biggest sized Baray that is located within Phimai Town. Today, Phimai city's Government tried to recreate Pleng Baray as a recreational ground of town people. There are public exercise equipments alongside the Baray.

9) Southern Gate (Pratu Chai)

The Southern gate of the town is known as Pratu Chai, or Victory Gate (See Figure 48). This is the entrance gate of the town. Arched gateways made of laterite. The southern gate faces towards Angkor. There are traces of an ancient road leading out from this gate that served as a major route from Angkor to Phimai.

10) Western Gate (Pratu Hin)

The Western gate of the town, Pratu Hin or Stone Gate. The gateways made of laterite. It is currently in the process of restoration.

11) Northern Gate (Protu Pee)

The Northern gate of the town, Pratu Pee or Ghost Gate. The gateways made of laterite. It is also in the process of restoration. This gateway opens to the Moon River.

12) Eastern Gate

The fourth gate seems to have long disappeared.



Figure 47: Kaew Baray (Sra Kaew) is one of water reservoir in Phimai Town. Located in the area of Phimai National Museum.

Source: <http://phimai.files.wordpress.com/2012/05/sa-kwan-trapang-kwan1.jpg>



Figure 48: The Southern gate of the Phimai town, Pratu Chai or Victory Gate. The Entrance gate of the Town. Arched gateways made of laterite.

Source: <http://www.thailandee.com/villes/phimai/porte-pratu-chai.jpg>

13) Moat and Ancient City's boundary

The moat around the city's boundary are found only on the Northeastern part of the Phimai Town.

14) Ancient Hospital (Arogayasala)

Arogayasala resembles the Khmer Nursing/Hospital (See Figure 49). According to historical evidences, it was built during King Jayavarman VII's reign.

15) Chong Maew Baray (Sra Chong Maea)

Chong Maew Baray is located outside of the Phimai's Ancient city wall to the South. Its size is 200 x 400 M. Today, it is located within the area of the Fine Arts Department of Thailand 12's office.

16) Tah Nang Sra Pum

Tah Nang Sra Pum (See Figure 50) is a ruined archeology architecture located on the edge of Phimai's Old Baray. It is located in the middle road-axis between the Victory Gateway of Phimai Town and the Phimai's Old Bay. Its form look similar to the cross. It was made of laterite, with a rectangle base. Its name came from the fairytale of the beautiful women of Phimai who bathe here. Today, it is located within the area of the Fine Arts Department of Thailand 12's office.

17) Khong Temple (Wat Khong)

Wat Khong is a ruined archeology architecture located in the middle of the Phimai's Old Baray. It is currently in the process of restoration.

18) Sra Nong Jok Baray (Phimai's Old Baray)

The Phimai's Old Baray, or Sra Nong Jok Baray is located on the southern part of the Phimai Town with the distance of 2 Kilometer. Its size is 800 x 1800 M. It is one of the biggest Khmer's Baray in Thailand. Because of the changes of Moon River over the time, the Phimai's Old Baray dried up. As for today, there are many land development within Phimai's Old Baray.



Figure 49: Arogayasala is resembling the Khmer nursing/ Hospital. Located on the south of Phimai Town, Nearby the Fine Arts Department 12 office.

Source: http://www.oknation.net/blog/home/blog_data/192/7192/images/BarayPhimai/BarayPhimai_10.JPG



Figure 50: Tah Nang Sra Pum is ruined

Source: http://www.oknation.net/blog/home/blog_data/192/7192/images/RachalG/Legend_8.JPG

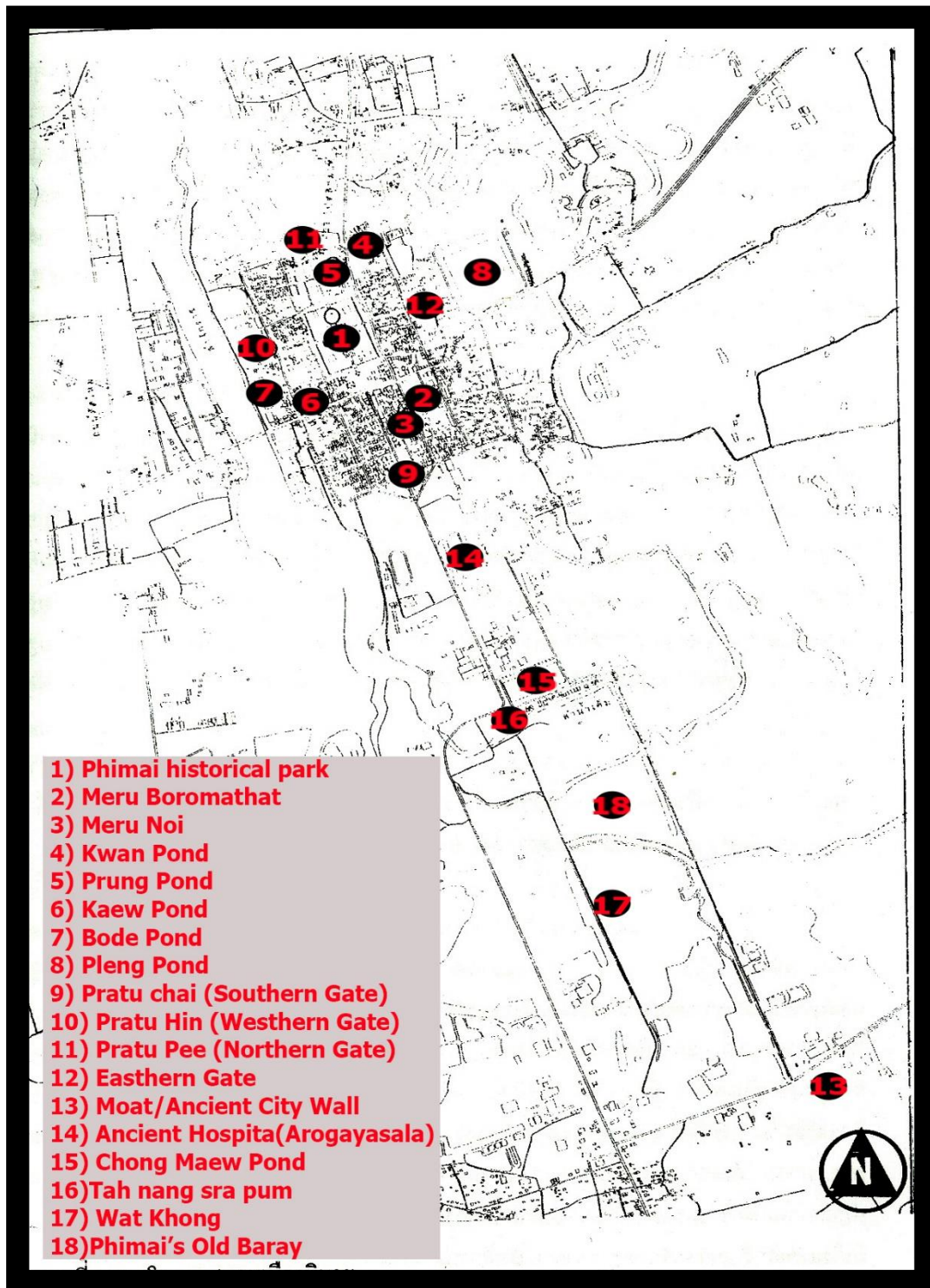


Figure 51: Map of Archaeology sites in Phimai Town. Date: 2013

Source: Olmtong Ektanitphong

3.9 Critical issue of present Phimai Town

According to the previous thesis researcher of Silpakorn University, Ms. Sunanta Chutinan, in the topic of "Cultural Heritage, Interpretation, Management and Promotion: Phimai Historical Park"⁷⁷

1. Phimai historical park was registered as an ancient city in 1936, however, the Fine Arts Department of Thailand did not announce to the public that surrounding area of the historical park are also protected areas under the ministerial regulation. This lacking of announcement is leading to problems of no buffer zone to protect the site from cars, roads, and the settlement of the community.

2. A new approach to the expanded urban areas in Phimai is leading to the misunderstanding of a number of principle of Ancient Urban Planning to people. It is important to get across the correct meaning because Phimai is one of the great examples of ancient Khmer urban planning.

3. Because of the lack of the budget from Thai's government, Phimai Historical Park has no conservation program. Throughout site evaluation, it is necessary to establish a conservation program to protect further deterioration to Phimai Historical Park.⁷⁸

4. The visitors' center of the park is not well organized, it incorporates too many functions, such as the administration office, a small exhibition of Phimai model and photographs, and the souvenir shop all in a small space.

5. There are few facilities for visitors at the site, for example, the parking lot in front of the historical park is too small. The tourist coaches have to park at the clock tower around the corner which can accommodate for only a few coaches. The only other facility on site is the rest

⁷⁷ Chutinan, " Cultural Heritage, Interpretation, Management and Promotion; Phimai Historical park."

⁷⁸ Chutinan, " Cultural Heritage, Interpretation, Management and Promotion; Phimai Historical park."

room which is adequate but need modernization. There is no catering facility or enough seating area for visitors

After the analysis of Khmer Culture in Thailand, Development of Settlement, History in Phimai Town and Archaeology sites in Phimai Town, it is evident that the water system, the Barays, is important in the Khmer's sanctuary design in the city context. Particularly, the archaeology sites in Phimai Town analysis show how important water reservoirs played a big role in the ancient Khmer town's urban design. Seven Barays were found within the town and surrounding areas. Some of the Barays are still in use and some are dried up. The Fine Arts Department of Thailand is still considering in the restoration the dried Baray.

Chapter 4

Analysis of Phimai's Old Baray

4.1 History of Phimai's Old Baray

The Phimai's Old Baray, Sra Nong Jok Baray, is located on the south side of Phimai Town with the distance of 2 kilometer from the town (. The Baray's direction was in correspondent with the direction of the town itself. The ancient inscription on the Gopura (door) at the southern side of Phimai Sanctuary mentions offerings of goods to religious places during the reign of King Worraman 1 (1651-1655 BC). The land of Phimai's Old Baray was an offering to religion.⁷⁹

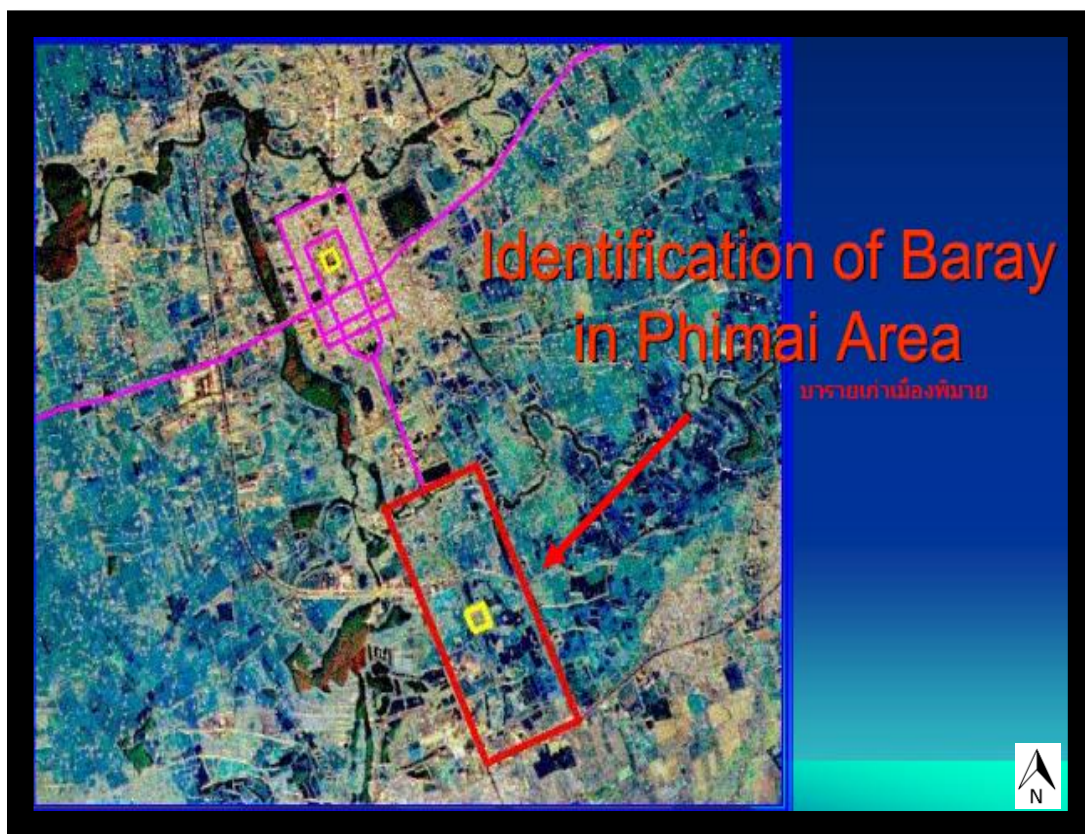


Figure 52: Map of identification of Phimai's Old Baray area. Date: Unknown
Source:<http://www.gisdevelopment.net/application/archaeology/general/archg0016pf.htm>

⁷⁹ Phimai Historical National Park, "The Phimai's Old Baray and Wat Khong" (paper reported proposal Project at Phimai Historical National Park, Nakhon Ratchasima, Thailand, 2012).

The Phimai's Old Baray is a large rectangular pool with the size of approximately 850 X 2000 m. The four sides of the Baray are made of high berms at its edges. At the central of the Baray is a high elevation area that is assumed to be the temple in the same pattern as in East Baray and West Baray at Angkor. This center island temple is called Wat Khong. After the field survey and contacting an archaeologist in the area, evidences can be found on the ground, such as a mound of earth with fragments of sandstone and laterite distribution surrounding the area that supported that assumption.⁸⁰ The most interesting evidence was that the temple aligned itself directly to the main temple of Phimai in the same direction of the alignment of the Phimai temple and the Baray. This temple in the middle of the Phimai's Old Baray was suspected as an important religious sites in Phimai Town.

4.2 The Current Conditions and Problems of Archaeological Sites

Today Phimai's Old Baray condition vary greatly due to the construction of the earthen dam at the edge of the northern part of the Baray. Also the construction of the road route (Phimai-Phuang) over to the edge of the ridge on the north, west, and south of the Baray, including many building constructions in the area of the Baray and its surrounding. Phimai's Old Baray has been dried for several centuries. Currently, major area are filled in with earth and became shallow. The temple in the center of the Baray was originally a mound. There is an ongoing archaeological excavation project in the area of the temple in the center of the Baray.⁸¹

⁸⁰ Phimai Historical National Park, "The Phimai's Old Baray and Wat Khong" (paper reported proposal Project at Phimai Historical National Park, Nakhon Ratchasima, Thailand, 2012).

⁸¹ "Phimai National Museum," last modified January 2008,
http://www.nationalmuseums.finearts.go.th/thaimuseum_eng/phimai/history.htm.

Currently, the area of the Baray became home to the farming industry, such as rice paddy, horticultural crops (See Figure 53 and 54). There are some residential and commercial uses such as a gas stations. Also, swamps and canals were dug in the former reservoir for agriculture within the area of Phimai's Old Baray.



Figure 53: Zoom in Map of Phimai Old's Baray. Date: 2012
Source: <http://www.oknation.net/blog/voranai/2011/04/30/entry-1>



Figure 54: Above and below picture are the current condition in the Phimai's Old Baray. The water dried up and became a waste land and farming industries.

Source: <http://www.oknation.net/blog/voranai/2011/04/30/entry-1>

4.3 Land utilization within the Baray and surrounding

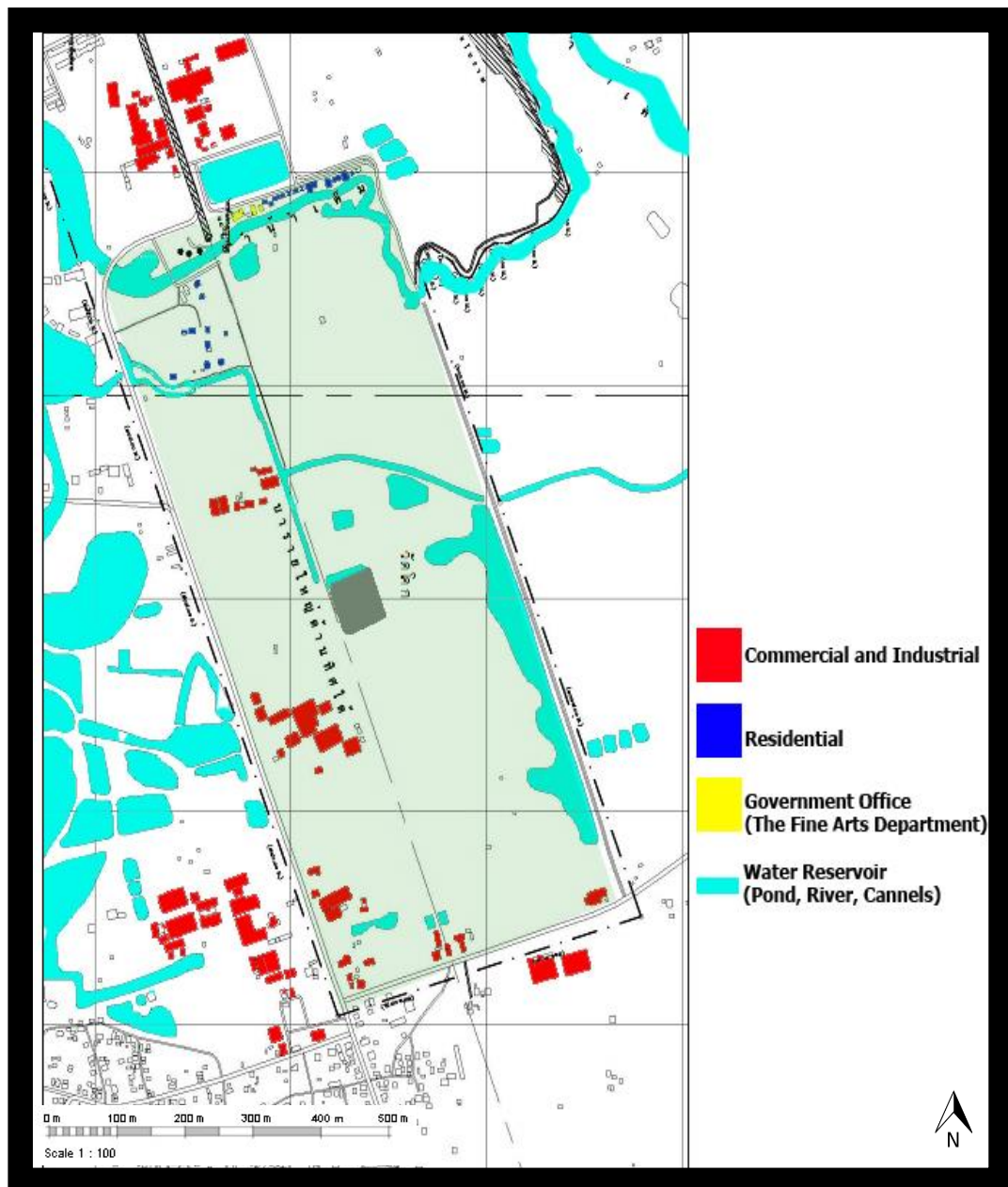


Figure 55: Land utilization analysis mapping include commercial/industrial, residential, Government offices, and Water Reservoir within and surround Phimai's Old Baray. Date 2013.
Source: Olmtong Ektanitphong

There are occupancies of land utilization, such as single-family residential homes, commercial, farming industry, rural agriculture, and government offices inside and surrounding the Phimai's Old Bay. Inside the boundary of Phimai's Old Baray, there are many residential homes and government offices, the Fine Arts Department 12 is located at the northern part. The three big farming industries are located on the west side within the boundaries of the Baray and one is located in the southeast side. Most of the area within the Phimai's Old Baray became wastelands. Also, a small farming agricultural crops are cultivated within the Baray. The water canal from Mun River called "Khmer canal" passes through the Baray on the north. Small ponds can also be found on the site. Approximately 300 meters away from the border of Phimai's Old Baray to the west, there are developments of commercial, industrial, and residential areas. On the other hand, the eastern side of the Phimai's Old Baray, are areas that are still undeveloped. The rest of the surrounding areas of Phimai's Old Baray are considered to be agricultural farming areas such as, rice paddy (See Figure 56, 57, 58, and 59).

The Land utilization analysis within the Baray and surrounding shows that there are possibilities for the development of the Phimai's Old Baray to be a new cultural tourism destination for Phimai Town. The Phimai's Old Baray is considered to be one of the most important archeology sites within the area of Phimai Town. The big water reservoirs can be advantageous in both areas of cultural tourism and farming agriculture. Since there are not many development and changes within and around the area of Phimai's Old Baray, it will be easy for the government to set up legislative and regulatory measures at a national level to protect the heritage property that might have a negative impact on the Phimai's Old Baray. Boundaries must be established to ensure the protection to the Phimai's Old Baray. The property within and surrounding the Phimai's Old Baray must provide the details on size, characteristics, and authorized uses of a buffer zone.

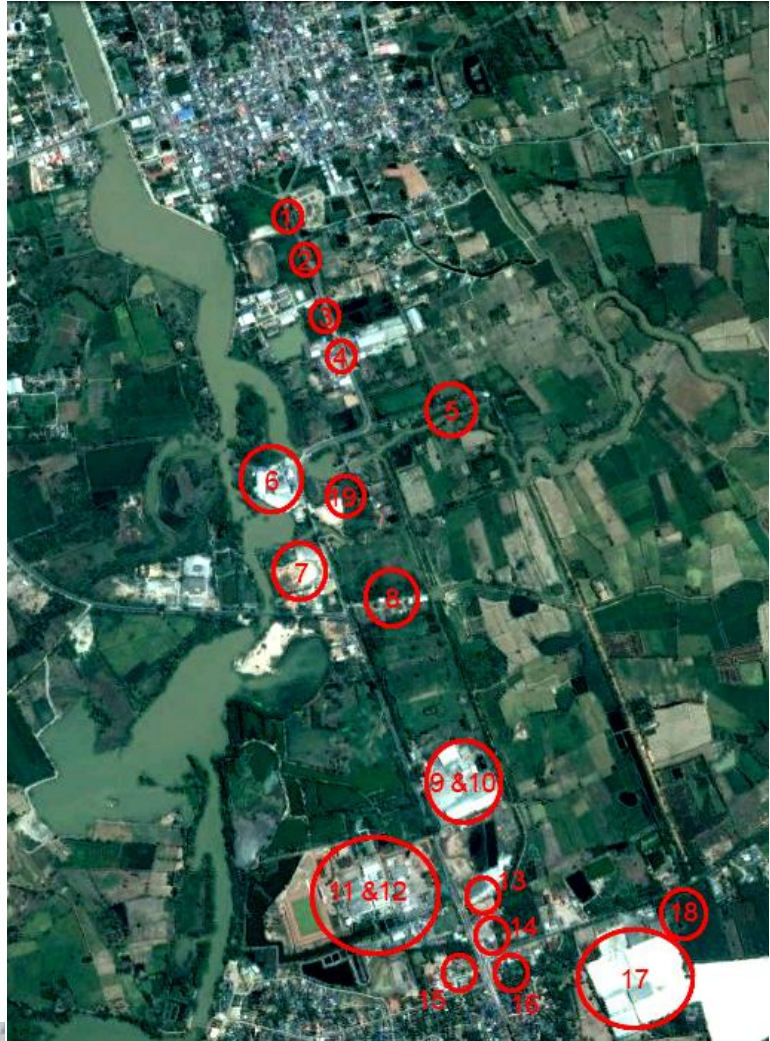


Figure 56: The Photos of Phimai' Old Baray analysis at the Royal Road from Phimai Town to Phimai's Old Baray in area of residential, industries, and commercials. There are a government offices and Housing residential at the North. Most of the industries are construction warehouse.
 Photograph Source: NatthaPhong SiriWatPhiChet

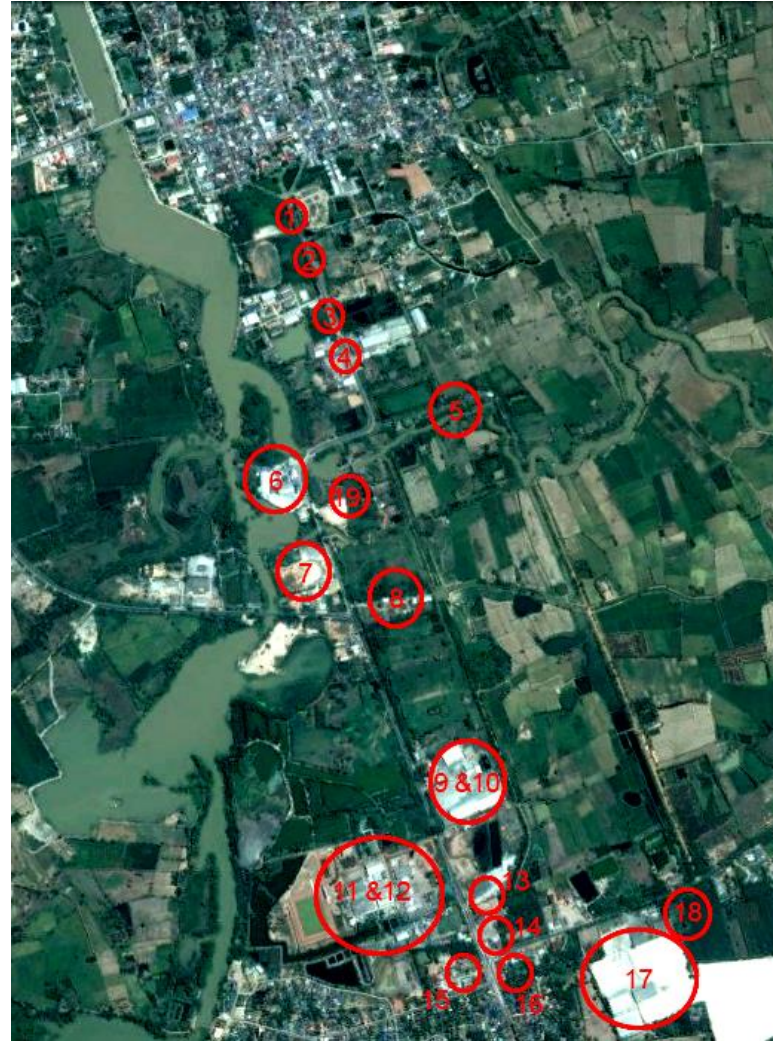


Figure 57: The Photos of Phimai' Old Baray analysis in area of residential, industries, and commercials. There are a government offices and Housing residential at the North. Most of the industries are construction warehouse.
Photograph Source: NatthaPhong SiriWatPhiChet

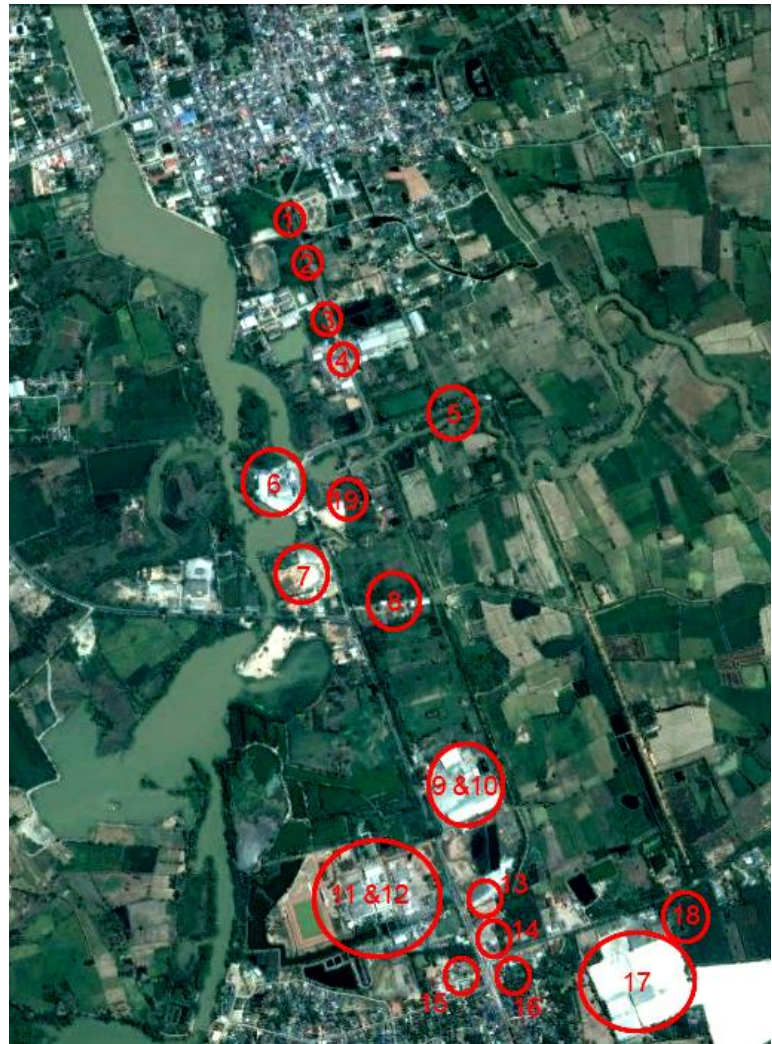
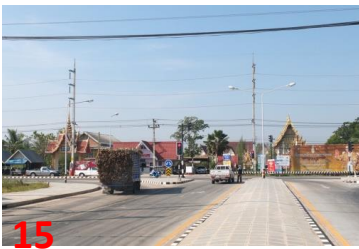


Figure 58: The Photos of Phimai' Old Baray analysis in area of residential, industries, and commercials. The Gas Station shown along Highway 206 for the needs of transportation.
Photograph Source: NatthaPhong SiriWatPhiChet



Figure 59: The Photos of Phimai' Old Baray analysis in area of waste land. The waste land within and surrounding area of Phimai's Old Baray become rice paddy for local farmers.
Photograph Source: NatthaPhong SiriWatPhiChet

Chapter 5

Investigation Design for Phimai's Old Baray Master Plan

5.1 Intervention of Schematic Design

From the overall site analysis in the area of the Phimai's Old Baray and the surrounding areas, I have chosen three main schematic designs to apply in this proposal at the Fine Art Department of Thailand. These schematic design will be based on the relationship of the Phimai's Old Baray and its surrounding contexts. There are relationships between the Phimai's Old Baray and the Phimai City on the northern side and the relationship of small villages on the southern side of the Phimai's Old Baray. Also consideration of the relationship of the water channels and agriculture on the eastern and western side of the Phimai's Old Baray. These four relationships enable to establish the designer layout for the new design of infrastructure within the area of Phimai's old Baray and its surrounding contexts (See Figure 60).

Moreover, the designer has considered the concept of conservation and preservation versus the concept of the model development in order to investigate the strengths and the homogenous aspects in the both of the concepts. These three schematic designs show the differing degrees in conservation and preservation in comparison to the concept of model development since the Phimai's Old Baray is considered as one of the important archeology site, the conservation of the place needs to be carefully considered. The main objective of the "Reclamation and Regeneration of the Ancient Baray: A Proposal for Phimai Historical Park" is how can I recreate The Phimai's Old Baray to become "a place" again. In this sense, I needs to explore in greater detail the authentic historic landscape and reproduce it in relation to the maintenance and resurgence. Each scheme has particular characteristics that differ from the other, thus each scheme has the potential to serve as a unique and attractive node parallel with the Phimai's Old Baray development. The following schemes are the potential schematic design description and analysis which shall serve as the foundation for the intervention proposals.

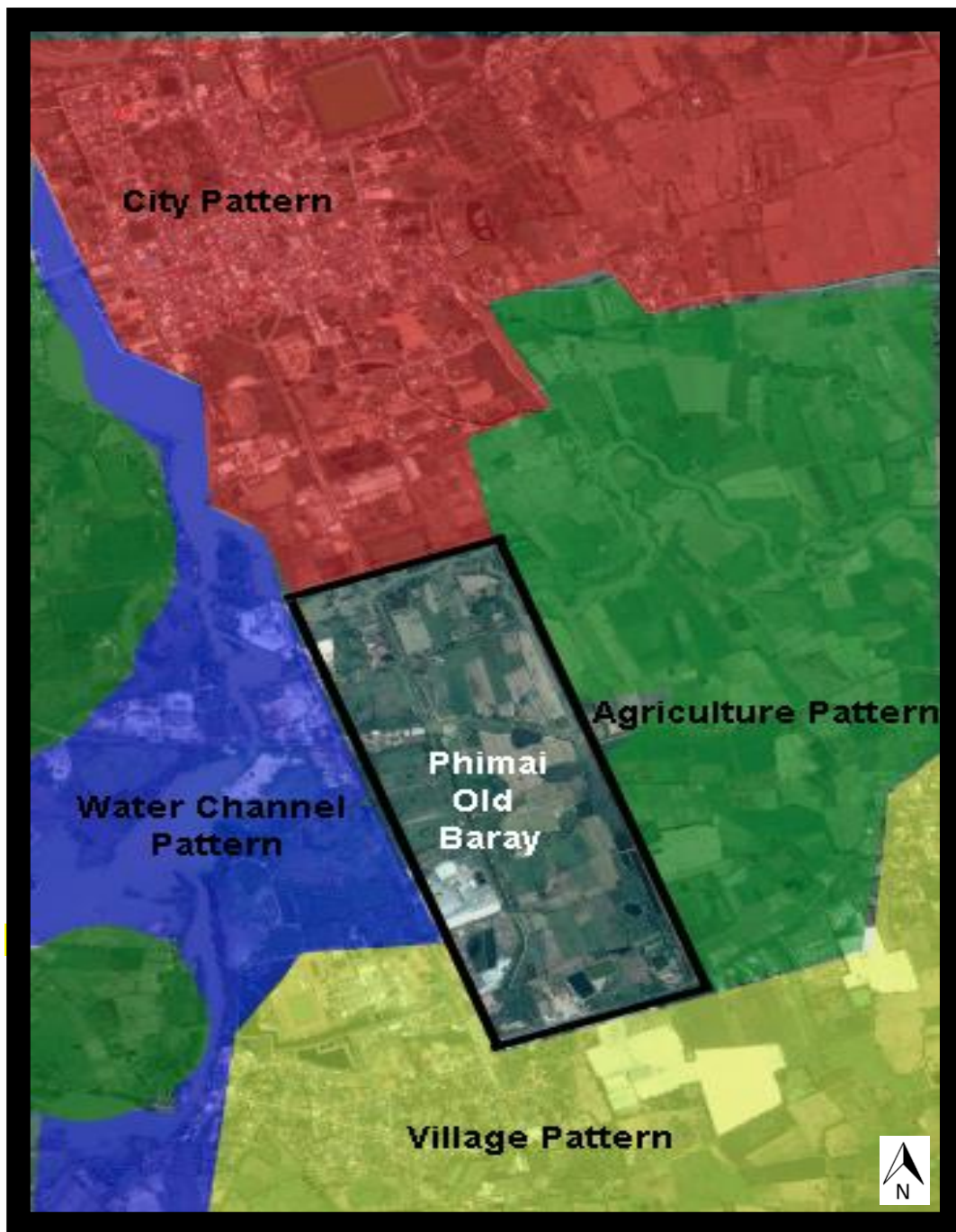


Figure 60: The main four patterns relationship to the Phimai's Old Baray; City Pattern, Water Channel Pattern, Village Pattern, and Agriculture Pattern.
Source: Olmtong Ektanitphong

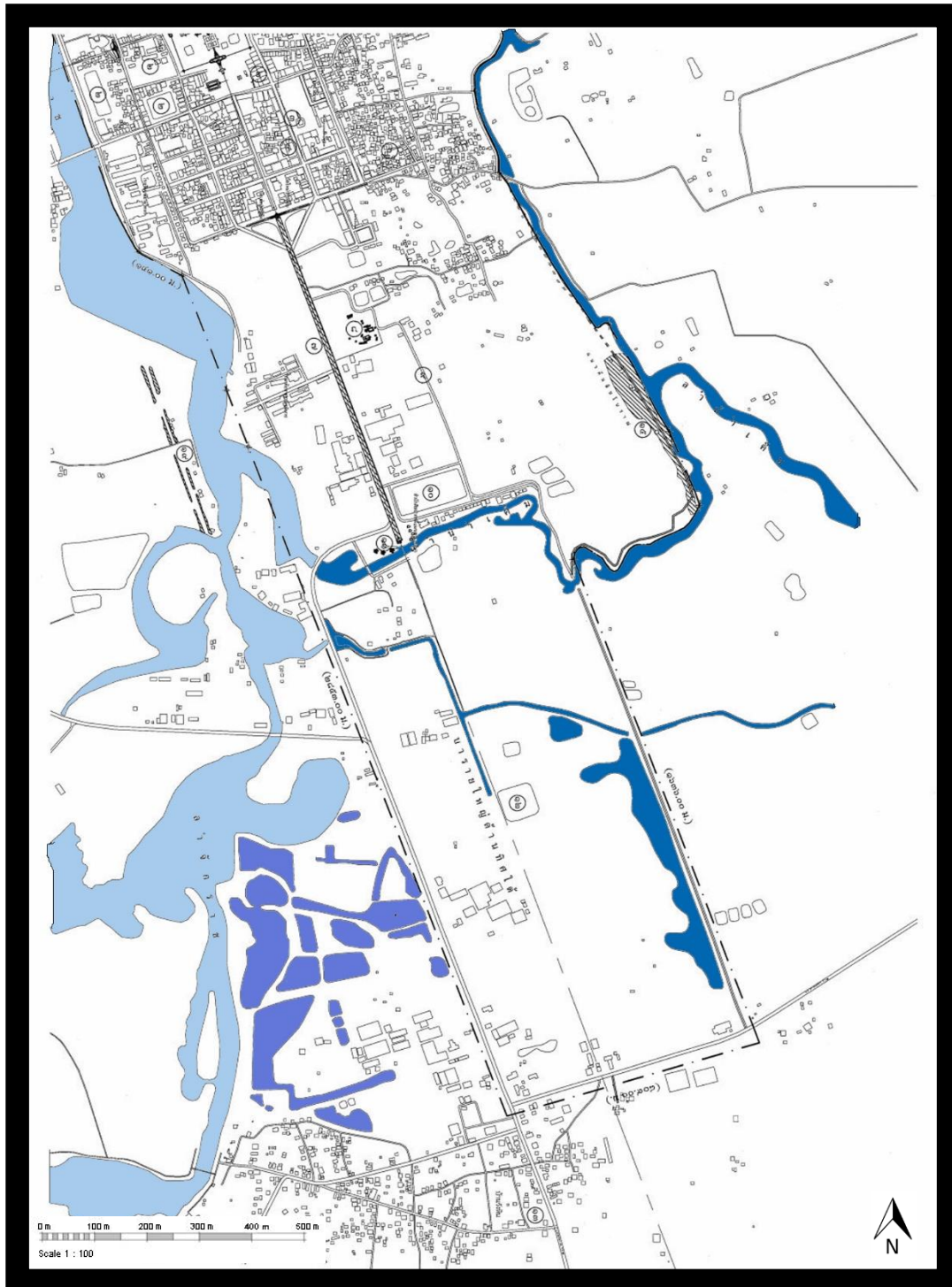


Figure 61: The design's boundary of The Phimai's Old Baray and its surround context.
Source: Olmtong Ektanitphong

Scheme 1: Civic Center Complex

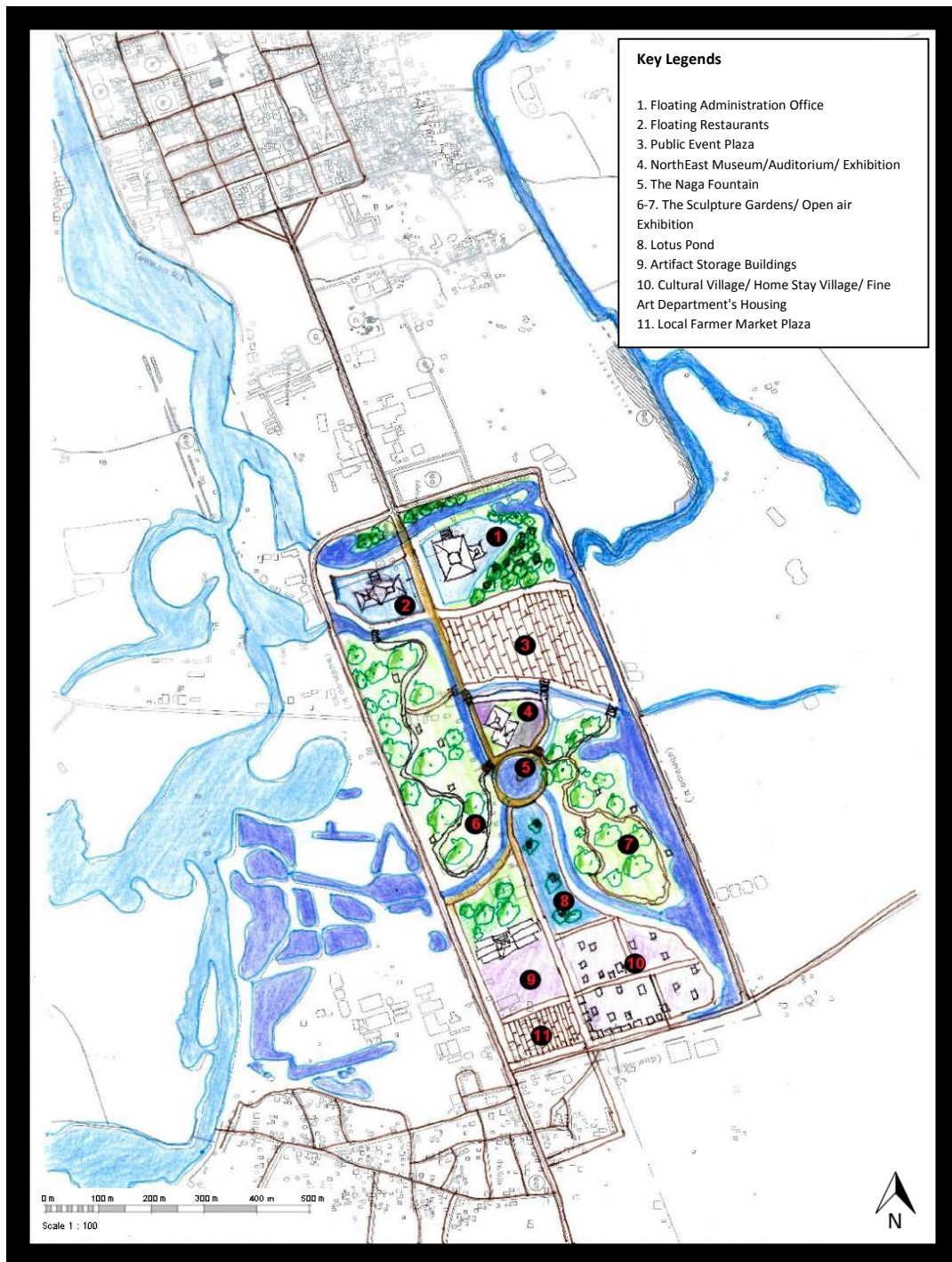


Figure 62: Hand-sketch of Scheme 1: Civic Center Complex Master Plan in The Phimai's Old Baray.
Source: Olmtong Ektanitphong

Scheme 1: Civic Center Complex focuses on the utilization and transformation of the large unused space within the Phimai's Old Baray into an urban park and open civic space for community use. The degree of the conservation of the Phimai's Old Baray is not much considered in this scheme. The Civic Center Complex consists of a number of landscapes and architectures that provide various space for socializing. The ancient irrigation system of the Phimai's Old Baray is partly introduced in this scheme. The Scheme aims to develop the space for the modern lifestyle within the area of the Phimai's Old Baray (See Figure 62).

Scheme 2: Agriculture Experience Center

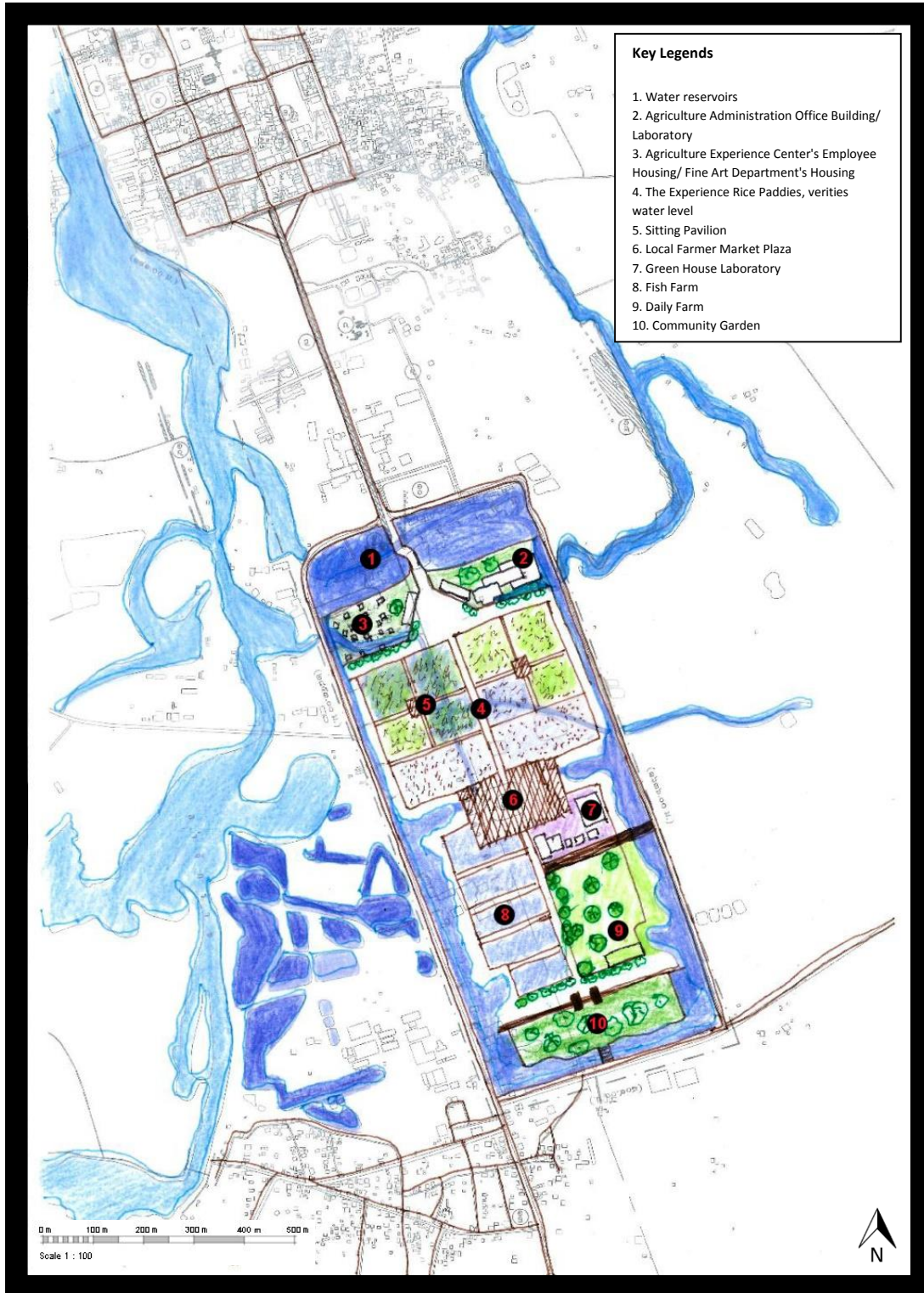


Figure 63: Hand-sketch of Scheme 2: Agriculture Experience Center Master Plan in The Phimai's Old Baray
Source: Olmtong Ektanitphong

Scheme 2: Agriculture Experience Center's proposal focuses on the utilization and organization of the current uses within the Phimai's Old Baray. The current condition within the Phimai's Old Baray space is the primarily that of rice paddies. The concept of the conservation versus development is equalized. In development aspect, each space should be transformed into modern agriculture experience such as The Experience Rice Paddies in verities water level, Fish Farm, Dairy Farm, and Community Garden. On the other hand, conservation aspect will include the agricultural irrigation system, which is the original function of the Phimai's Old Baray. This scheme celebrates and respects the original uses of the Phimai's Old Baray (See Figure 63).

Scheme 3: The Baray

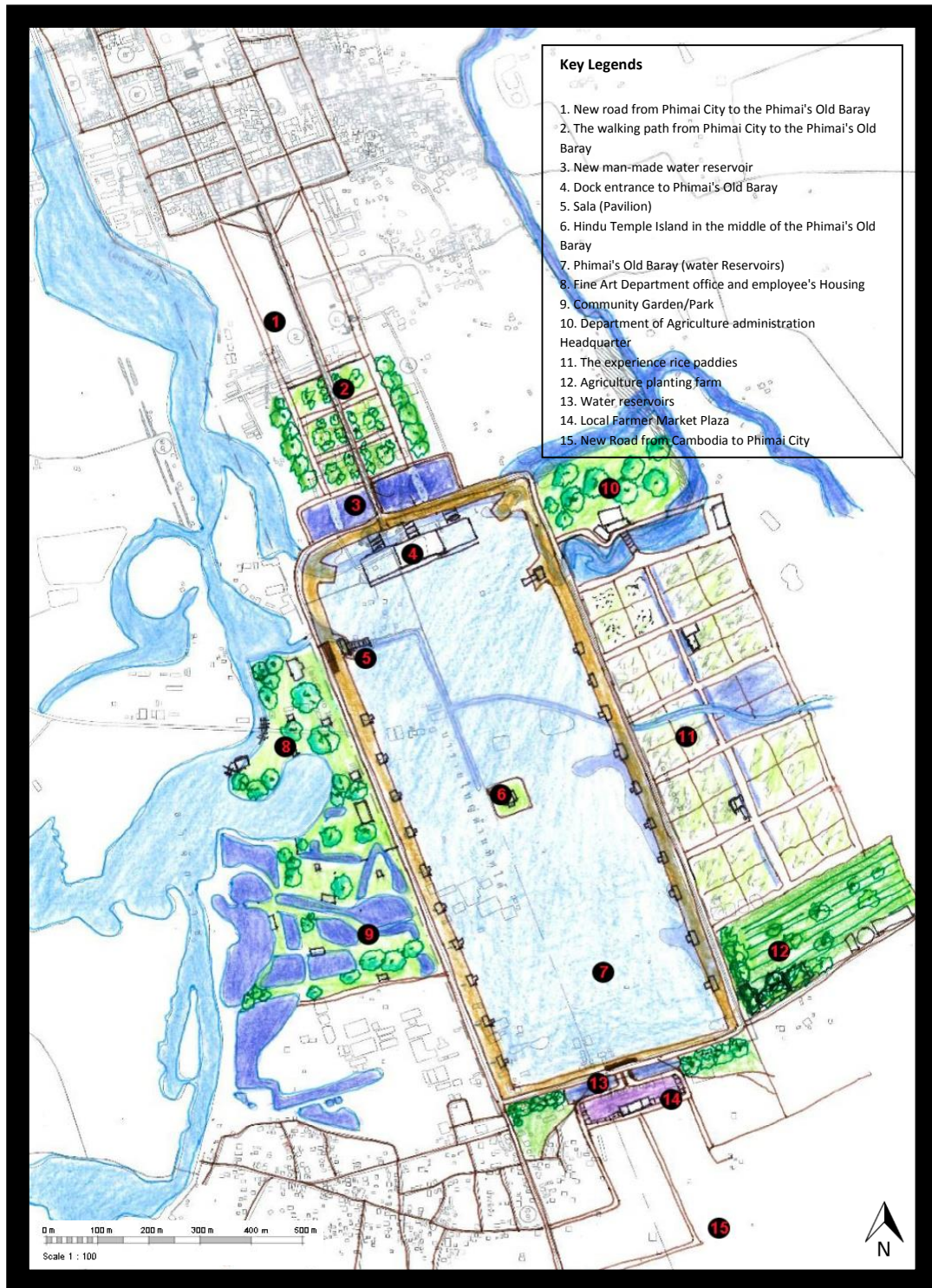


Figure 64: Hand-sketch of Scheme 3: The Baray Master Plan in The Phimai's Old Baray

Source: Olmtong Ektanitphong

Scheme 3: The Baray's proposal focuses on the conservation and preservation of the Phimai's Old Baray to its original state. The designer reclaims the artificial body of water into the Phimai's Old Baray. At the north side of the Phimai's Old Baray, the pedestrian path from Phimai City to the Phimai's Old Baray should be restored and developed to the original state. Reclaiming the pedestrian path can present a clear picture of the axis in the original Khmer urban planning concept. The development also focuses on the surrounding area of the Phimai's Old Baray. The large unused space on the East side of the Phimai's Old Baray needs to be utilized agriculturally. Due to the close adjacencies to residential and commercial zones, the western side of the Phimai's Old Baray should be comprised of a number of landscapes and architectures that can provide various spaces for events, socialization, and relaxation. The Phimai's Old Baray will be able to become the recreation space for both local people and tourists to visit. Small pavilions will be located in every 30 feet for shading purposes. The Baray is preserved as Khmer culture and can also serve to represent the Thai culture. The local people can use the Baray to celebrate the Loi Krathong festival. The Loi Krathong festival is the Thai traditional festival celebrated annually throughout the country. The name could be translated as "to float a basket", and comes from the tradition of making krathong, or buoyant, decorated baskets, which are then floated on a river (See Figure 64).

Chapter 6

Case Studies

6.1 Case Studies

Based on the site analysis on previous chapter, Phimai town is one of most valuable archaeological sites and Phimai's Old Baray is considered as the important feature of Khmer's urban planning and architecture. The current condition of Phimai's Old Baray is the basis of my design concept that leads to three different design schemes: completely fill the water, half fill the water, and not fill the water into the Baray. These three design schemes are based on the degree of preservation vs. development. Finally, I have decided to further develop scheme 3 because it relates the most to the historical preservation of the Khmer empire. By doing so, I will investigate the different aspects of landscape design through the following case studies:

CASE STUDY: THE SHENYANG ARCHITECTURAL UNIVERSITY BY KONGJIAN YU

This innovative campus was designed to reconnects students to China's agricultural landscapes. In March of 2002, the Shenyang City in North China's Liaoning Province commissioned the designer to create a new, 80 hectares suburban campus for Shenyang Architectural University. This campus originally located in downtown of Shenyang City, the university was established in 1948 and played an important role in educating architects and civil engineers for the city of Shengyang and for the country as well.

Turenscape's principle, Kongjian Yu convinced the Shenyang to use the form of rice fields as the main design element for the campus plan. The reason is Shenyang area known for the source of a short grain rice in China. Yu strongly insisted on creating the existing rice field area of the campus could continue to function as a productive landscape⁸².

⁸² "Shenyang Architectural University Campus, "Chinese-architects Project, accessed July 23, 2014, http://www.chinese-architects.com/en/projects/1798_Shenyang_Architectural_University_Campus

The concept for the design had two major objectives; to create a high quality environment for modern agricultural educational and incorporation of elements of the traditional agricultural environment. This is a symbol and reminder of the historical and contemporary role of agriculture in China. The resulting rice paddy area not only serves as a symbolic link to the heritage of the region, but it is also a functional field that produces food consumed in the campus dining facilities daily.

The rice paddies are located in the southwest region of the campus and cover approximately 3 hectares (7 acres) of the campus' approximately 200 acres. The design project had to contend with the design had to contend with the following three existing site conditions as following:

"1) **Former agricultural use:** the new site for the proposed campus was originally a rice field, the origin of the famous "Northeast Rice," known for high quality due to cool climate and its longer growing season than the those from southern China (one single crop of rice in this area will last from mid-May until the end of October, while in southern China it can only last 100 days. This is one reason that rice can be used as a landscaping material). The soil quality was good and a viable agricultural irrigation system was still in place.

2) **Small budget:** only about one US dollar per square meter was allocated for landscaping. Most of the budget funded the design and construction of 320,000 sq. m of new university buildings.

3) **Short timeline:** the university required the design to be developed and implemented within one year. Classes were expected to begin in the fall semester of 2003."⁸³

⁸³ "General Design Award of Honor: Shenyang Architectural University Campus, Taizhou City," American Society of Landscape Architects. Accessed August 1, 2014, <http://www.asla.org/awards/2005/05winners/090.htm>.

The concept of this design mainly use rice, native plants and crops to keep the landscape productive. The design also fulfilling its new role as an environment for learning to raise awareness of land and farming to college students who are leaving their homeland to the city urban. In addition, Yu also seeks to show how inexpensive and productive agricultural landscape can, through landscape design and management, and usable space as well.

Today their rice became a university icon: the rice produced on the campus is harvested and distributed as “Golden Rice.” The Golden Rice is serving both as a keepsake for visitors of the school, and also as a source of identity forth newly established, suburban campus. The most importantly of all, the widespread of “Golden Rice” could raise awareness of new hybrid landscape solutions that could both continue old, yet crucial uses such as food production, while supporting new uses, such as the education of China’s new architects.⁸⁴

⁸⁴ "Shenyang Architectural University Campus," Turenscape, accessed August 1, 2014, <http://www.turenscape.com/english/projects/project.php?id=324>.

CASE STUDY 1

THE SHENYANG ARCHITECTURAL UNIVERSITY BY KONGJIAN YU



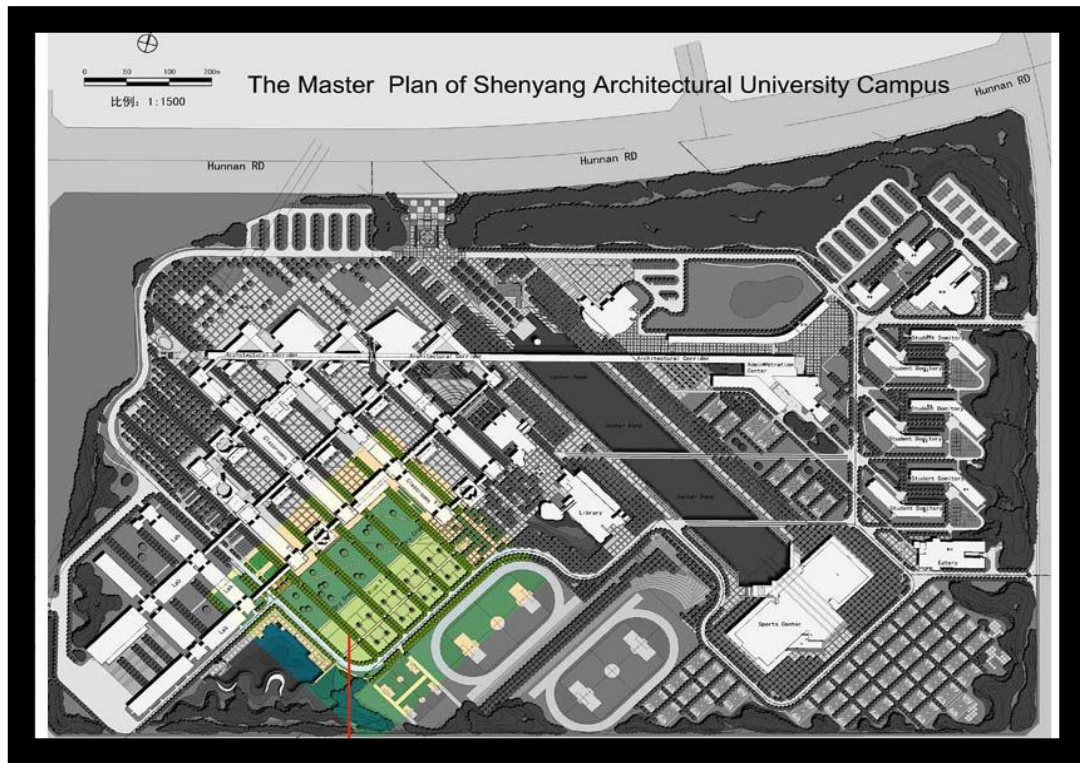


Figure 65: Master plan of the campus rice field.
Photography Source: Konjian Yu



Figure 66: Rice paddies distributed in combination with study platform for students for uses away from the classroom. Each platform is covered with a native canopy tree.
Photography Source: Kongjian Yu

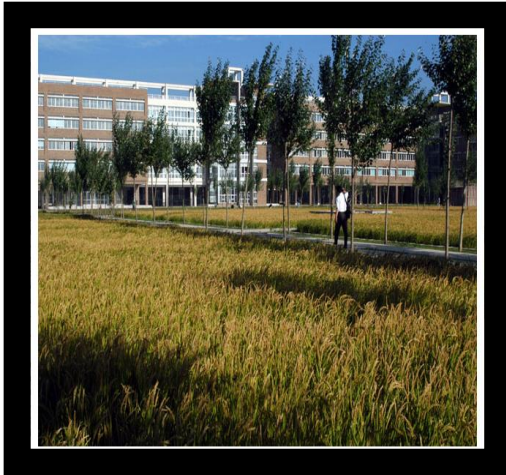


Figure 67: The autumn color of rice paddy and the experience of walking through the productive landscape.
Photography Source: Kongjian Yu



Figure 68: Rice fields and buckwheat field seen from inside the classroom window.
Photography Source: Kongjian Yu

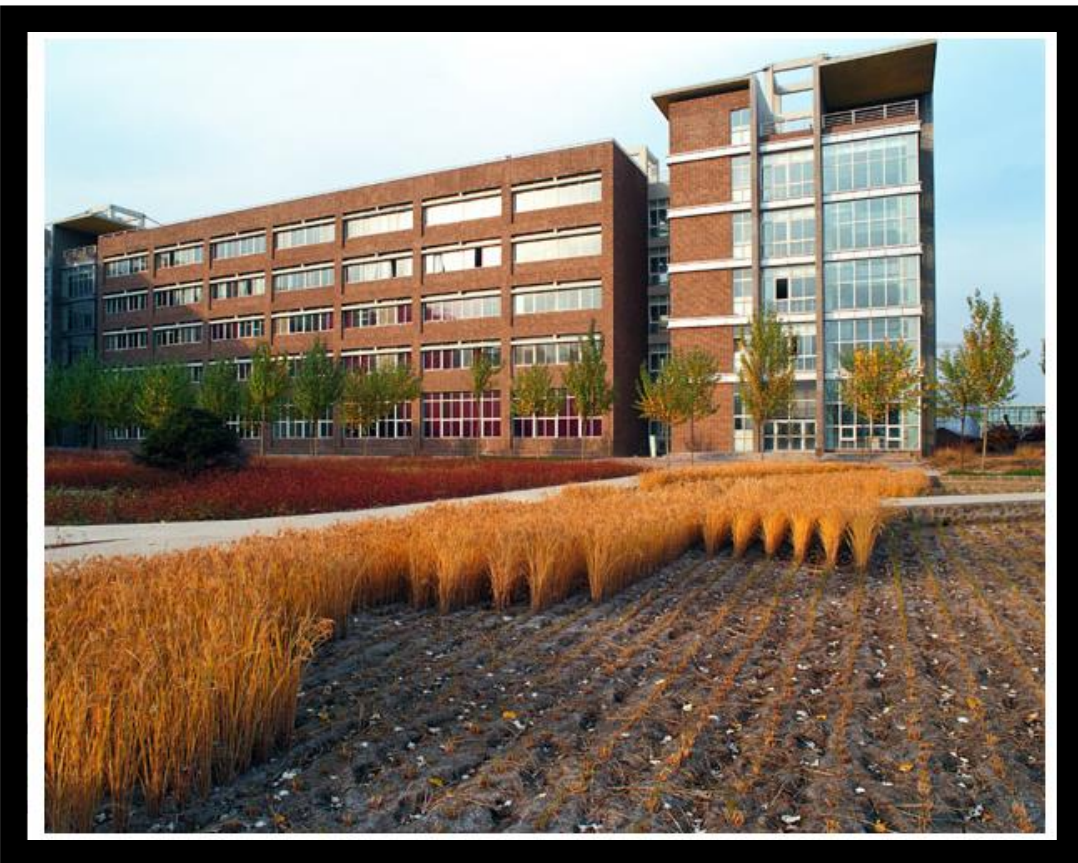


Figure 69: Rice and buckwheat patches left over in the early winter give off a bright warm color to the cold atmosphere.
Photo Source: Kongjian Yu



Figure 70: The rice planting day: the first Saturday after mid May was designated as the rice planting day for the university. Students and faculty members will celebrate the planting of rice seedling. It is an unforgettable and unique experience to the students, and is becoming an integral part of the university culture.

Photography Source: Kongjian Yu



Figure 71: The rice harvesting day: The last Saturday of October each year was designated as the rice harvesting day, when all the students and faculty members participate in harvesting their own rice. This way, the long lost tradition of rice culture in China becomes a campus culture.

Photography Source: Kongjian Yu

CASE STUDY: NASHER SCULPTURE CENTER GARDEN BY PETER WALKER

The landscape architect Peter Walker designed the most inspiration open-air garden museum, The Nasher Sculpture Garden. The Garden is part of the Nasher Sculpture Center, which covers a full city block in downtown Dallas, Texas. The area of the Nasher Sculpture Center is 10,000 square foot museum area with 1.5-acre sculpture garden. It was completed in 2003 to house the extensive modern and contemporary art collection of real estate developer and banker Raymond Nasher and his wife Patsy.⁸⁵

The Nasher Sculpture is one of the great sculpture gardens where art enhances with the nature, the roofless museum seamlessly integrates the indoor galleries with the outdoor spaces creating a museum experience unlike any other in the world. This sculpture garden can hold between twenty and thirty pieces of art, some can be permanently and some in changing in displays. According to the American society of Landscape architect website, the one of the greatest concept about this design is the movement of the sculptures in the museum. "The great weight of some of the pieces and the movement of sculpture in and out of the garden necessitated the invention of a special soil that drains perfectly without catch basins, is strong enough to hold the weight loads, and can support the growth of a special resilient grass turf as well as many large specimen trees. To allow as much flexibility as an indoor museum space, pavement was kept to a minimum while meeting public ADA requirements. Stone plinths distribute flexible systems of lighting, sound, security, and irrigation through the garden as well as provide casual seating and additional sites for smaller pieces of sculpture."⁸⁶

⁸⁵ "Nasher Sculpture Garden," The cultural Landscape Foundation's 2012 Landslide. Access August 1, 2014, <http://tclf.org/sites/default/files/microsites/landscape-patronage/nasher-sculpture-garden.html>.

⁸⁶ "General Design Award of Honor: Nasher Sculpture Garden," American Society of Landscape Architects. Accessed August 1, 2014, <http://www.asla.org/awards/2004/04winners/entry332.html>.

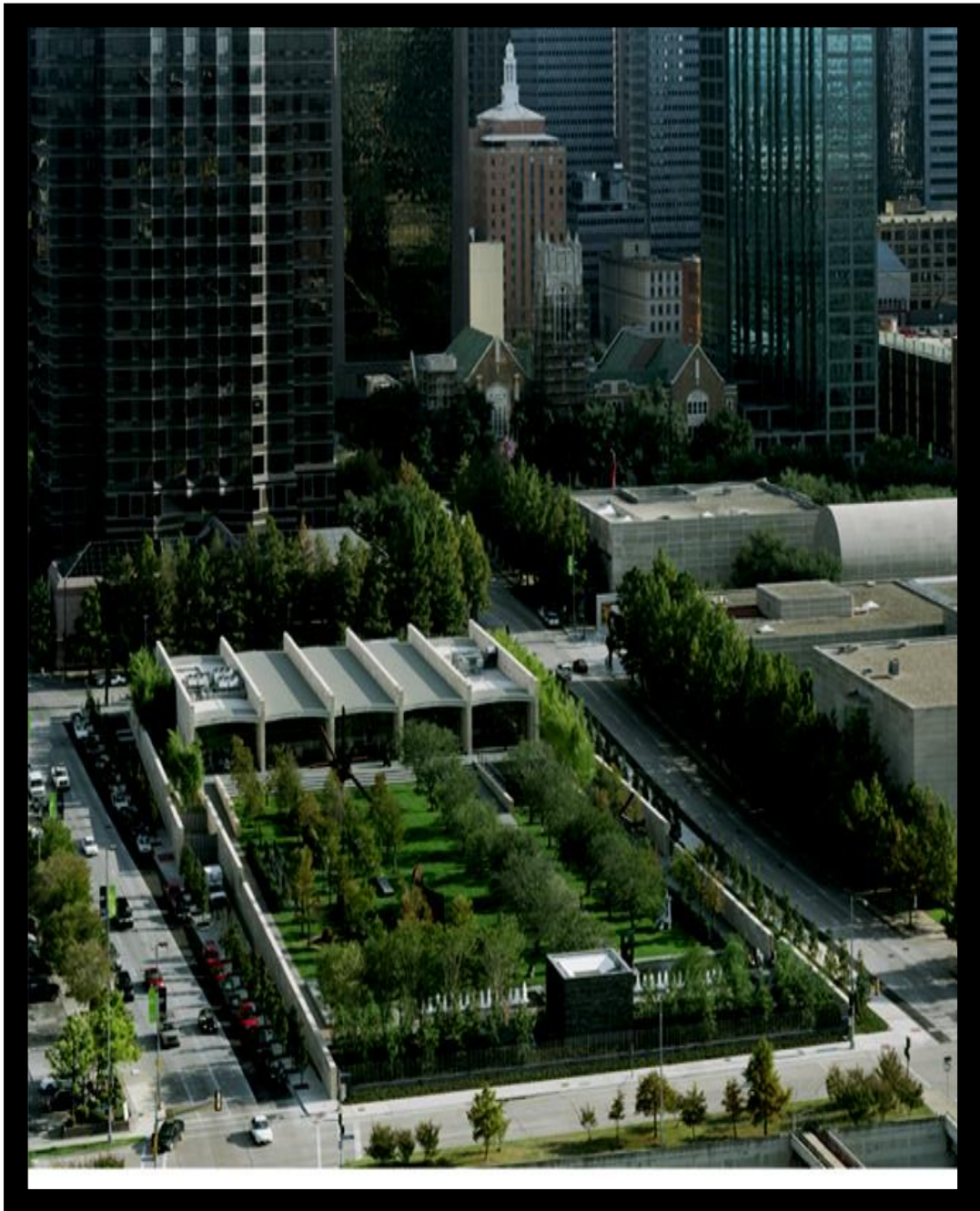
The advantage of natural air and light is taking place in this design. The museum's pavilions are topped by a barrel vaulted glass ceiling. It will allow natural light to filter down and illuminate the museum's collections; to temper and control the flow of the sun's rays. The designer developed a cast-aluminum sunscreen for the building, which was delicately calibrated to allow light to filter in from the north, in order to protect the sculptures and visitors from over-exposure to heat and light. The pavilions were laid-out according to the sun's path across the sky. The museum's pavilions has two levels: the ground level included three galleries, institute offices, a boardroom and a gift shop. The galleries area have polished stone walls and timber floors. A basement is much larger than the superstructure, houses a further gallery for delicate objects, additional offices, an auditorium, conservation workshops, a kitchen, mechanical services and so on. These, too, give on to the garden, which occupies by far the greater part of the Centre's site.⁸⁷

The outdoor sculpture garden is linear plane of lawn and terraces. The varying species of plantings include more than one-hundred species set into the landscape to help divide the space into garden rooms, and clusters and as allées. The main water features are two lily pools along the garden wall with fine arcs of water from jets mounted in the wall, and three pools in the rear of the garden with a row of vertical jets. This water features provide sound protection from the surrounding area and create idyllic experience for visitors.

⁸⁷ "Nasher Sculpture Center," Wikipedia, the free encyclopedia. Accessed August 15, 2014, http://en.wikipedia.org/wiki/Nasher_Sculpture_Center.

CASE STUDY 2

NASHER SCULPTURE CENTER GARDEN BY PETER WALKER & PARTNERS



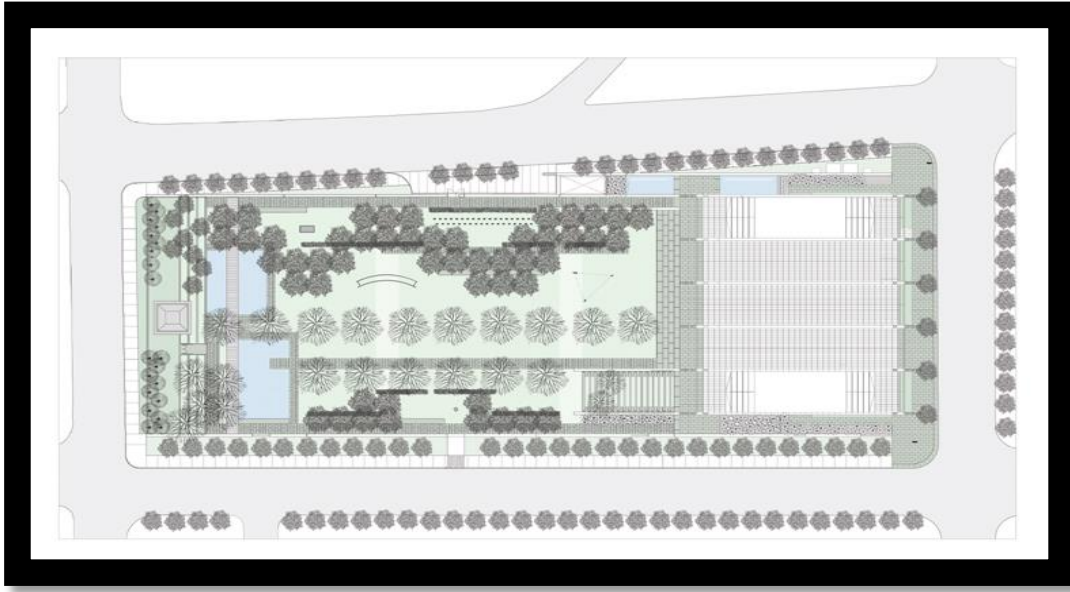


Figure 72: Master plan drawing of the Nasher Sculpture Center, Dallas TX with tree layout and overview
 Source: <http://www.asla.org/awards/2004/04winners/entry332.html>

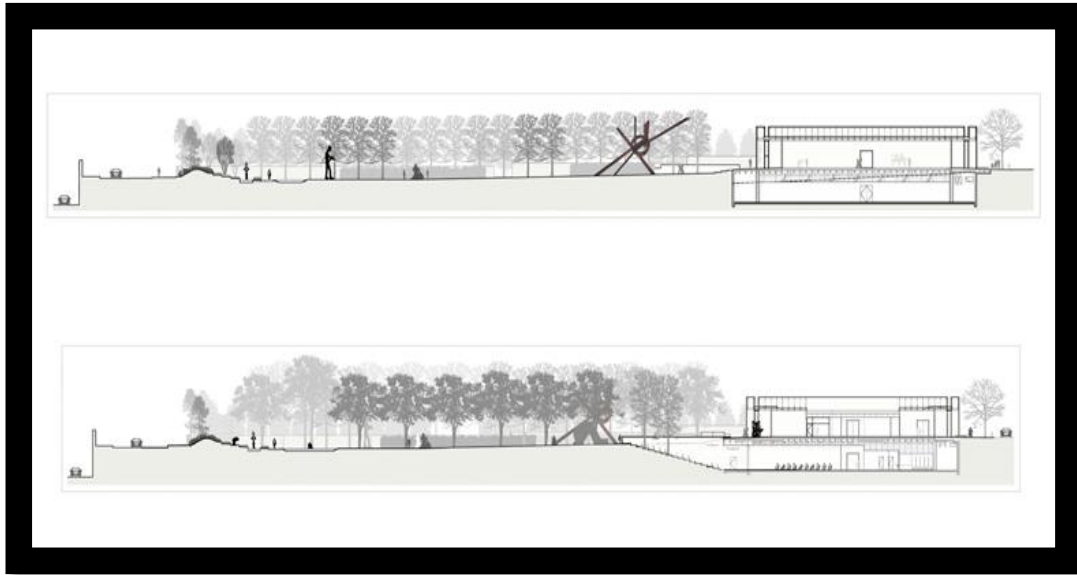


Figure 73: Two Sections of the garden forming the long axes along Olive and Harwood Street cut through the garden terraces and the other through the amphitheater and lower theater.
 Source: <http://www.asla.org/awards/2004/04winners/entry332.html>



Figure 74: Outdoor view of linear-planted live oaks with one of the pools in the background.
(Photo: Tim Wight - Peter Walker & Partners)
Source: <http://www.asla.org/awards/2004/04winners/entry332.html>



Figure 75: Aerial view of the museum's pavilions
Source: <http://candysdirt.com/wp-content/uploads/Nasher-rooftop-575x322.jpg>



Figure 76: Outdoor view of the stone terrace and sculpture garden from inside the museum.
Source: <http://www.asla.org/awards/2004/04winners/entry332.html>



Figure 77: Opposite side view of the Turrell Room and dual pools with sculpture and trees fully integrated into the design.

Source: <http://www.asla.org/awards/2004/04winners/entry332.html>

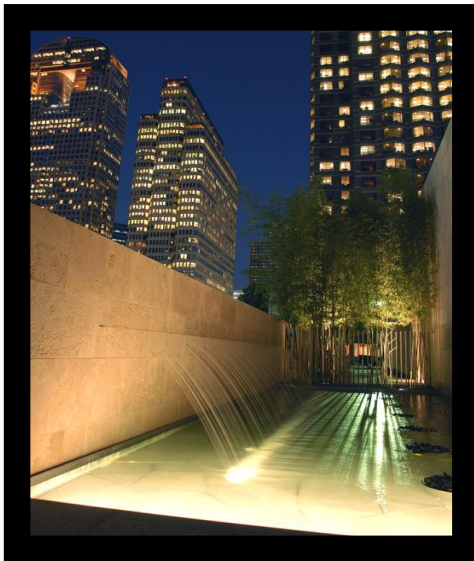


Figure 78: The garden wall fountain at night.
Source: <http://www.asla.org/awards/2004/04winners/entry332.html>

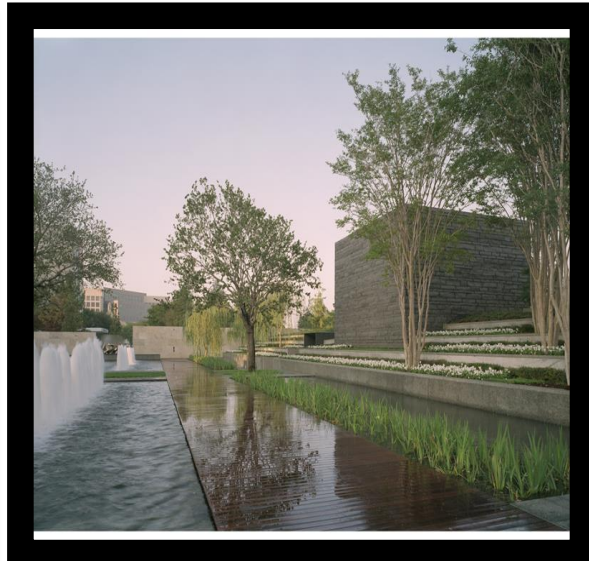


Figure 79: The rear terraces and Turrell Room beyond the reflection pools provide sound protection from the surrounding area and subterranean freeway with a wooden boardwalk connecting the two main stone paths.
Source: <http://www.asla.org/awards/2004/04winners/entry332.html>

CASE STUDY: MASTER PLAN FOR LUMBINI, NEPAL BY KANZO TANGE

The Japanese architect Kenzo Tange was prepared a Master Plan for the Development of Lumbini by emphasizes the pilgrimage aspect of Lumbini. This Master Plan for Lumbini was approved by UN and the Government of Nepal in 1978. The Master plan includes a buffer zone of twenty two square miles to support the serenity and protection of Lumbini. The plan, which was completed in 1978, has as its objective to restore an area of about 7.7 km², to be known as the Lumbini Garden, centering on the garden and the Ashoka Pillar, with an additional area of 64.5 km² to be developed in its support. Master Plan for Lumbini World Peace City or Lumbini Viswa Shanti Nagrama aims to preserve Lumbini by developing the place as a spiritual and sacred place. The master plan provided the outline for preserving the ancient ruins as well as turning an inaccessible, barren site into a place for pilgrimage. A Master Plan covers an area of 5 miles x5 miles with the central square mile being the Sacred Garden within which is the UNESCO World Heritage Property. However, Kenzo was responsibility in 1 mile x3 miles area of the Master Plan, which includes the following three zones: New Lumbini Village, Cultural/Monastic Zone and the Sacred Garden - are part of the Lumbini Project Area. The three zones area of the Kenzo Tange Master Plan are connected by a canal in the central link.⁸⁸

The Lumbini Project Area design based on Buddhist symbolism of geometric shapes and the path to enlightenment. The site started from the entrance is placed in the north from where the visitor enters the site to begin the journey from a location of “worldly” activities. After that the visitor need to proceeds to the Cultural & Monastic Zone for knowledge and spiritual

⁸⁸ "Kenzo Tange Master Plan for Lumbini," UNESCO. accessed August 10, 2014, <http://www.unesco.org/new/en/kathmandu/culture/lumbini-past-present-future/kenzo-tange-master-plan-for-lumbini/>

purification, then reaching the Sacred Garden (within which is the World Heritage Property) for enlightenment.⁸⁹

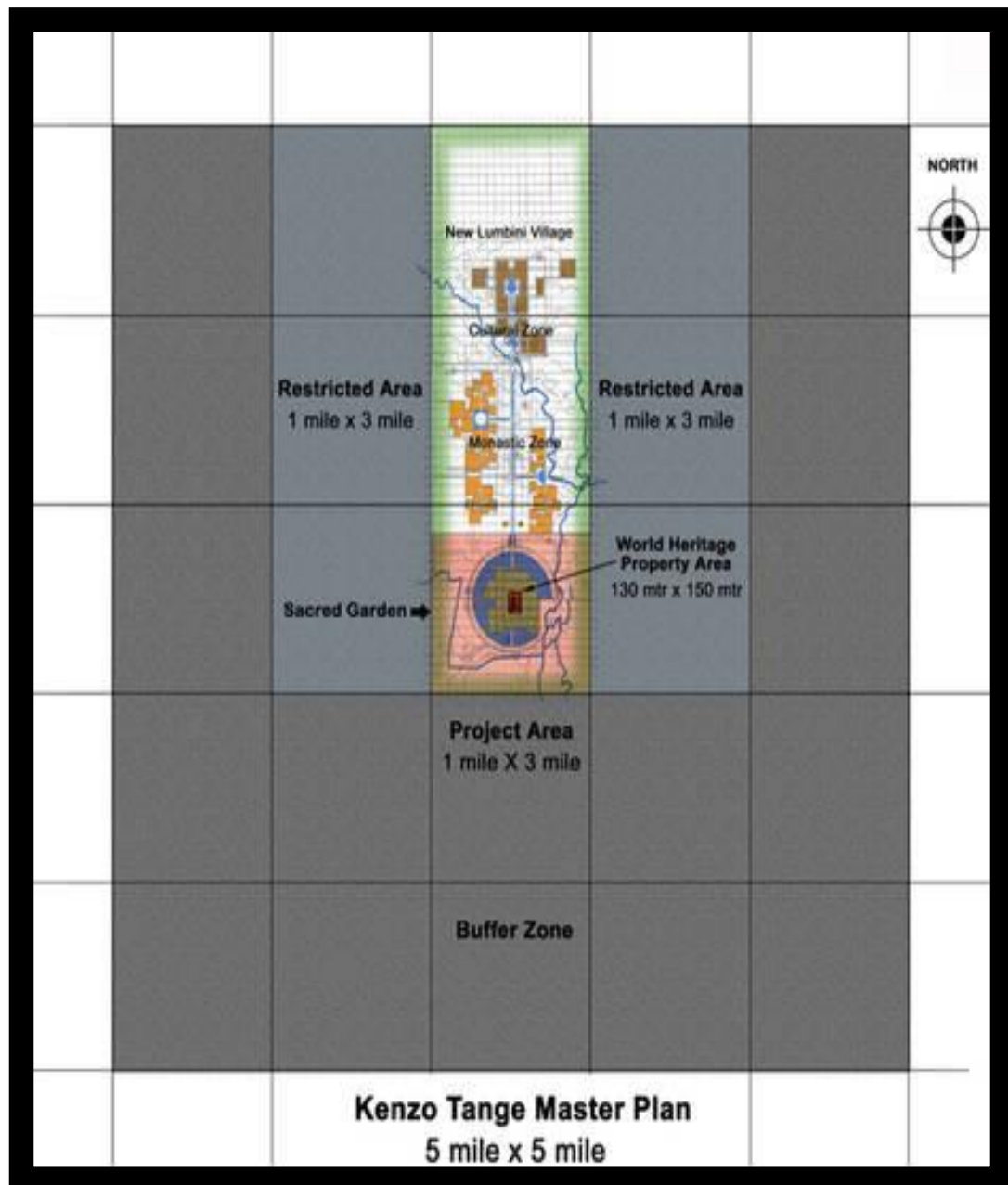
Today, nearly 20 years later, little progress has been made in the effort to develop Lumbini. An estimated USD 64 million is needed to fully complete the Master Plan. The objective of master plan was designed to turn Lumbini into a major centre of pilgrimage and tourism. It lays a solid foundation to protect the spiritual, archaeological and cultural assets of Lord Buddha's birthplace. To make this master Plan complete, consider financial support and assistance worker are needed, so that the historical accounts as well as the spiritual, archaeological and cultural assets that are associated with Lord Buddha's life, are fully preserved and protected for current and future generations.⁹⁰

⁸⁹ "Superimposed master plans and the sacred garden," The Himalayan. accessed August 11, 2014, <http://www.thehimalayantimes.com/fullNews.php?headline=Superimposed+master+plans+and+the+sacred+garden&NewsID=340321>

⁹⁰ "USD 64 million needed to complete Master Plan for Lumbini," UNESCO. accessed August 10, 2014, http://www.unesco.org/new/en/kathmandu/about-this-office/single-view/news/usd_64_million_needed_to_complete_master_plan_for_lumbini/#.VAEcw010zIU

CASE STUDY 3

MASTER PLAN FOR LUMBINI, NEPAL BY KANZO TANGE



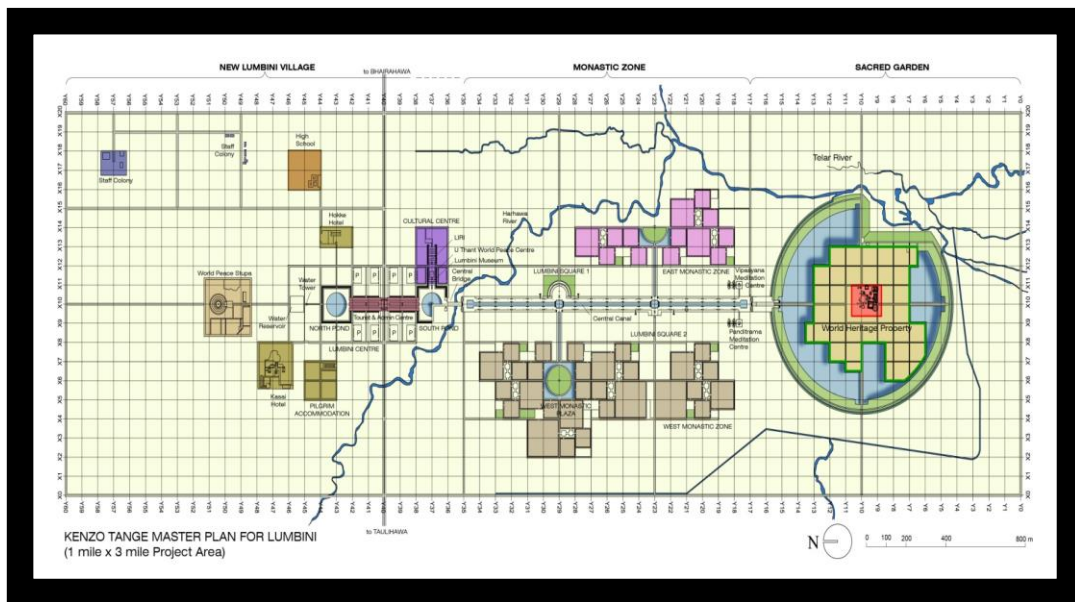


Figure 80: Kenzo Tange Master Plan for Lumbini (1 mile x 3 miles project area)

Source: <http://www.unesco.org/new/en/kathmandu/culture/lumbini-past-present-future/kenzo-tange-master-plan-for-lumbini/>

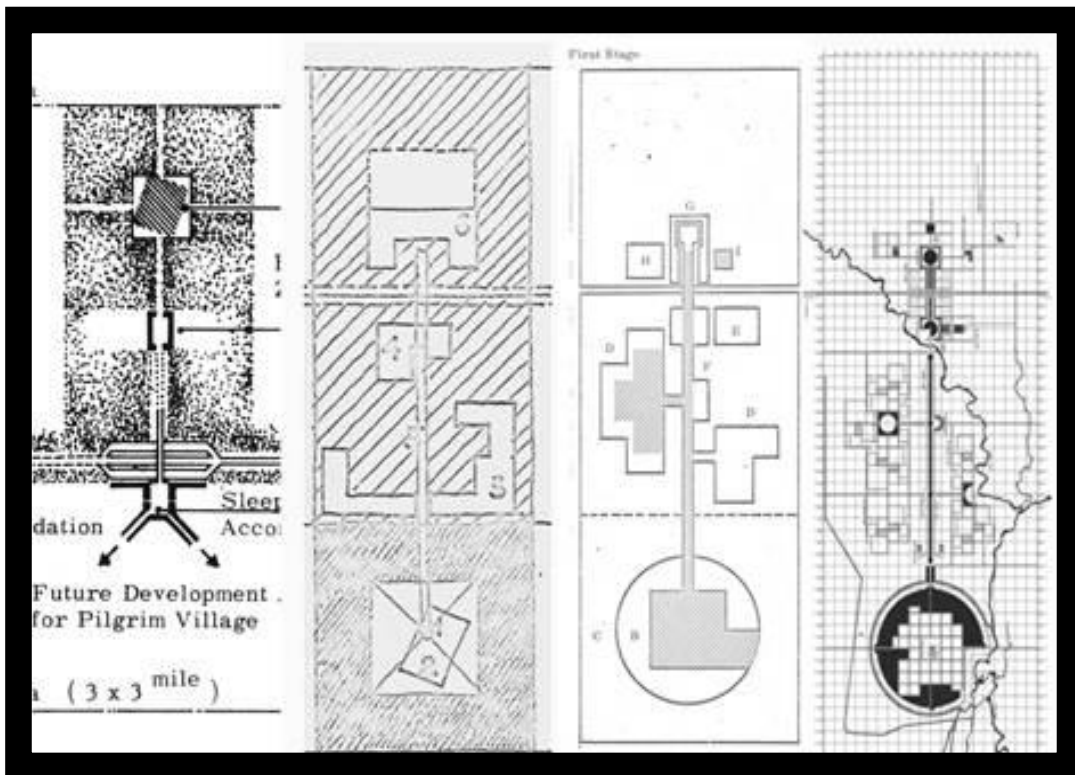


Figure 81: Kenzo Tange Master Plan Sketch over the Years

Source: <http://www.unesco.org/new/en/kathmandu/culture/lumbini-past-present-future/kenzo-tange-master-plan-for-lumbini/>

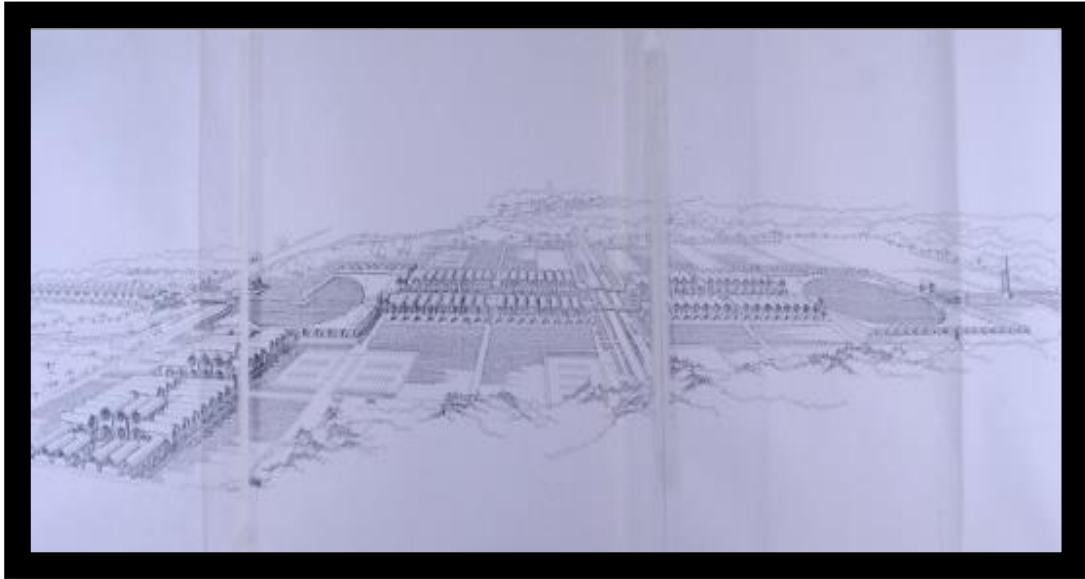


Figure 82: An architectural drawing of Lumbini Master Plan, showing the northern section as conceived by Kenzo Tange and his team

Source:<http://www.lumbiniresearch.com/about-lumbini.html>



Figure 83: An old photograph of the Ashoka pillar in Lumbini and the Maya Devi shrine behind the pillar

Source:<http://www.lumbiniresearch.com/about-lumbini.html>



Figure 84: A view of Lumbini before the Lumbini Master Plan

Source:<http://www.lumbiniresearch.com/about-lumbini.html>

Chapter 7

Design Proposal

7.1 Design Summary

The design focuses on the regeneration of the Phimai's Old Baray to become the designated place where both tourists and local can access. At the same time, the issue of the conservation and preservation of the Phimai's Old Baray to its original state is considered. The main aims of the design are to conserve the outstanding universal value of the cultural heritage. The design will ensure the physical survival of the Ancient Baray, and also enhances visual character of the landscape setting while increasing biodiversity and improving the interpretation. The design will include the landscape setting around the boundary of the Ancient Baray. The objectives of the design is to create awareness, knowledge, and understanding of the heritage site.

From the Intervention of Schematic Design in Chapter 7, the Ancient Baray of Phimai Master Plan will be developed from the waste lands rural area to the conservation of the cultural assets area (See Figure 85). The design aim to increase understanding and promote the importance of the heritage resources for public enjoyment, education, and academic knowledge. The Royal Road that connected Phimai Town and Phimai's Old Baray will be restored to the walking path as in the original state during Khmer Empire. The currently dry Phimai's Old Baray will be refilled with the water from the Moon River to the East and Khem Canal to the West of the Ancient Baray in order to reclaim its original function. Also, the Hindu temple that is located in the middle of the Phimai's Old Baray will be restored to the most original state. This restored Hindu Temple will become an archeological symbol to the Phimai's Old Baray. The

restoration of the Royal Road, Phimai's Old Baray, and The Hindu Temple to its original state will successfully meet the conservation and preservation aspects of the plan. The next step of the design is bringing out the visual characteristics of the landscape by increasing biodiversity and event activities setting. This should enhance visitor enjoyment and appreciation of the

archaeological, historical, and environmental value (See Figure 86).

The development of The Ancient Baray of Phimai will be divided into three zones; The Royal Road, Phimai's Old Baray, and the local Farmer Market. The Khmer Empire's original connecting axis between Phimai Town and Phimai's Old Baray will be more visible to people. The development of The Royal Road from Phimai Town to Ancient Baray is not only to restore the walking path to its original state, but also to regenerate event activities along the road to enhance visitor enjoyment. The Archaeological Park along the traveling lounges, the location of the ancient architecture, Arogayasala (Ancient Hospital) and Dharmasala (rest house), built by Khmer's king will give visitors an experience of ancient route from Angkor to Phimai town (See Figure 89 and 103). Further along the travel lounges near to the Phimai's Old Baray on the western side of the road is the location of the small size Baray, Chong Maew Baray, and on eastern side, the new event activity space called Lan Haeng Panya (Canny Arena) will be proposed (See Figure 90). Lan Haeng Panya will be the final designated stop before the visitors reach the Phimai's Old Baray. Lan Haeng Panya will be a gathering arena where many activities and events can be happen. For example, during festival season people can use this arena as a preparation place where people can conduct public meetings and discuss ideas(See Figure 108).

At Entrance of the Phimai's Old Baray, visitors approach the large, floating pavilion, Sala Klang Nam (Big Pavilion). It creates the feeling that visitor is floating on water and is completely surrounded by water. At the same time, visitors will experience picturesque view of the Phimai's Old Baray. This Sala Klang Nam is also the location of the visitor information area (See Figure 91,109 and 110). Phimai's Old Baray contains fourteen small, floating Salas (pavilion) from point to point. The main purpose of these fourteen small, floating Salas is for scenery and shading purposes (See Figure 124). Since Thailand have a hot and humid climate, biodiversity will be seen surrounding Phimai's Old Baray for shading purposes. Along the Western side of Phimai's

Old Baray walk path, there are the Lan Phalang Chiwit (Food Resurgence Plaza) and Uthayan Asian Ratchaphruek (Asian's flower in the nostalgia garden). Lan Phalang Chiwit (Food Resurgence Plaza) is an open-air food court that allows visitors to enjoy a variety of freshly prepared gourmet foods from many choice of restaurants inside the plaza (See Figure 92 and 111). Next to Lan Phalang Chiwit is small sculpture garden that allows visitors to appreciate the archaeological and historical value (See Figure 112). Furthermore, along the walk path, a new designated place called Uthayan Asian Ratchaphruek (Asian's flower in the nostalgia garden) will be located (See Figure 96 and 115). In the Uthayan Asian Ratchaphruek visitor will enjoy different species of Asian flowers (See Figure 116). Visitors are also welcome to browse the nursery any day of the week and purchase local plants and flowers at the flower Shop inside the garden (See Figure 117). The highlight feature of Uthayan Asian Ratchaphruek is the surrounding nature ponds next to the area. Move forward to the Eastern side of the Phimai's Old Baray walk path, to the location of the agricultural areas. Visitors will get to experience many activities and areas along the path way such as Lan Phakphon (Recreation Center Garden), Lan Thung Khao (Scenic Spots for Rice Paddies) , Pratu-narm Phan Baray (water-gate pool), and Suam Sukkhaphap Phimai (Phimai's Exercise Community Park).

Lan Phakphon (Recreation Center Garden) is located on the South-East side of the Phimai's Old Baray (See Figure 99 and 123). Visitors can relax and meditate around the space that is filled with winding trails, rice paddies, and sycamore trees. Researchers found that meditative feelings were at the highest when participants were going through the green space, they will also feel less frustration, and more long-term excitement and engagement. Next to Lan Phakphon, to the North is Lan Thung Khao (Scenic Spots for Rice Paddies). Lan Thung Khao is a scenic spot for rice paddies in the surrounding area. The beautiful and visually captivating rice fields will fills visitor with delight. Because planting rice feels so natural and is a perfect way to

be connected with the land, the people, and the culture (See Figure 125). Then, the path approaches Pratu-narm Phan Baray (water-gate pool), where the location of the input water from the Khem Canal that has a steady flow to Phimai's Old Baray (See Figure 126). Lastly to the North of the Phimai's Old Baray, there is Suan Sukkhaphap Phimai (Phimai's Exercise Community Park). Suan Sukkhaphap Phimai is used by people of all ages and of different fitness levels as part of a healthy lifestyle, from lunchtime joggers to Olympic and Paralympic athletes. Visitors can enjoy and engage in fitness training in a variety of outdoor environments (See Figure 94, 128 and 129).

The six activities event setting in Phimai's Old Baray create different experiences for visitors from point to point. The different views of the landscape design in each event setting area will create fascinating experiences for the visitors and encourage them to walk forward. The visitors will also appreciate the unique characteristics of both historical and environmental value in each setting. The Phimai's Old Baray will become "a place" that creates awareness, knowledge and, understanding of the heritage site to the visitors.

Lastly the development of Phimai's local farmer market is located to the southern side of Phimai's Old Baray. It is the final destination to visit. This farmer market will connect the villages on the south to Phimai's Old Baray. This farmer market is accessible to both locals and tourists (See Figure 100).

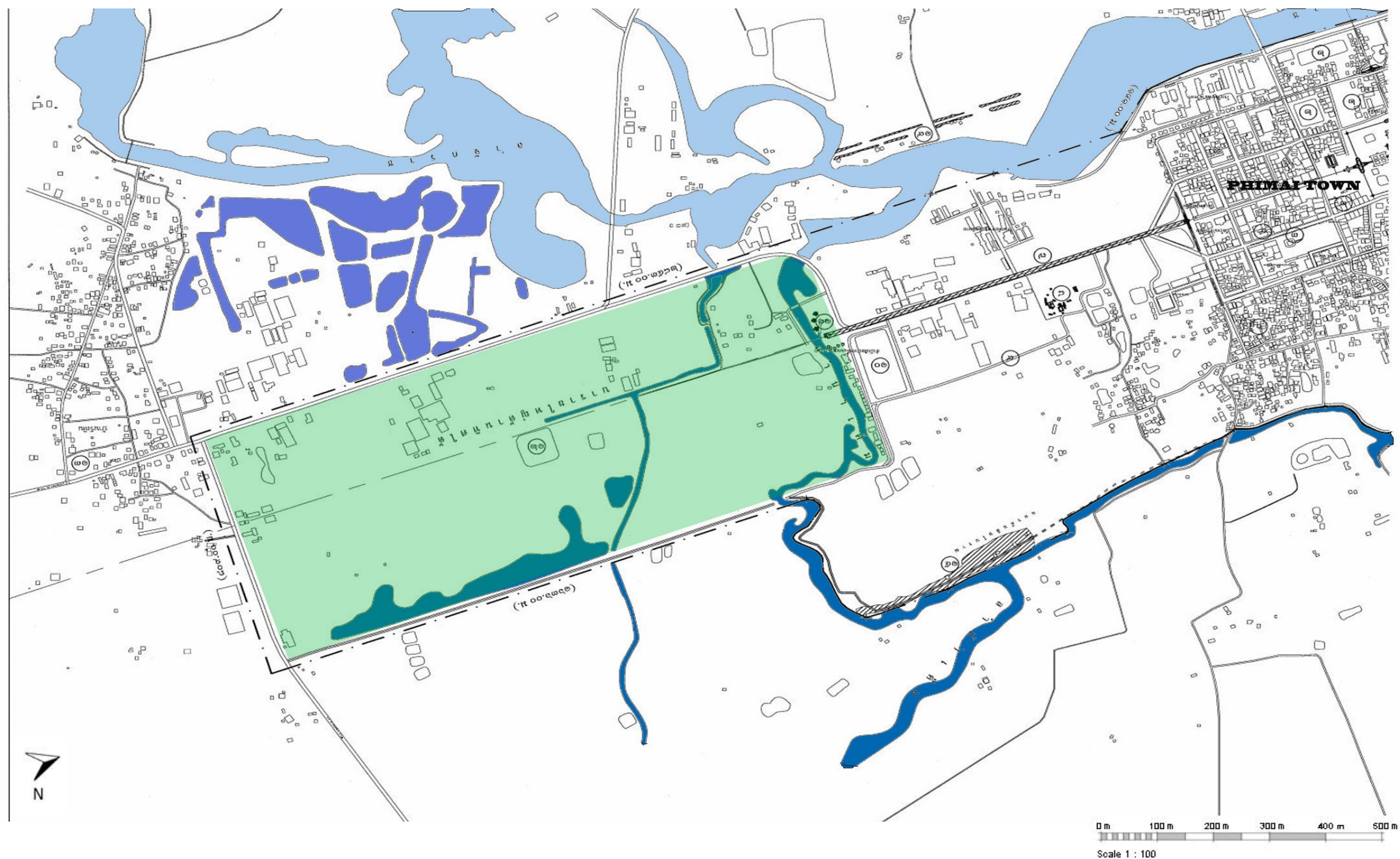


Figure 85: The Ancient Phimai Baray Current Condition Site Plan
Source: Olmtong Ektanitphong



Figure 86: The Ancient Baray of Phimai Master Plan
Source: Olmtong Ektanitphong



1. New road construction From Phimai City to Phimai's Old Baray.
2. The Royal Road walking path from Phimai City to Phimai's Old Baray.
3. Lan Haeng Panya (Canny Arena).
4. Sala Klang Nam (Floating Pavilion) at the front entrance to Phimai's Old Baray.
5. Lan Phalang Chiwit (Food Resurgence Plaza).
6. Sculpture Garden Exhibition.
7. Sala (Floating Pavilion).
8. Conservation Hindu Temple Island in the Middle of the Baray.
9. Fine Art Department office and Employees' Housing.
10. Community Park/Garden.
11. Uthayan Asian Ratchaphruek (Asian's Flower in the nostalgia garden).
12. Phimai's Local Farmer Market.
13. New Road Construction to show the old axis From Cambodia to Phimai.
14. Lan Phakphon (Recreation Center Garden).
15. Agriculture Planting Farming.
16. Lan Thung Khao (Scenic Spots for Rice Paddies).
17. Pratu-nam Phan Baray with Floating Sala.
18. The Experience Rice Paddies, verities water level.
19. Suam Sukkhaphap Phimai (Phimai's Exercise Community Park).
20. Phimai's Department of agriculture laboratory.
21. Department of agriculture administration Headquarter.

Figure 87: The Ancient Baray of Phimai Master Plan Location Identification



Section- A show the royal road walking path from the Phimai Town and archaeological park with commercial surrounding.

Section- B show the royal road walking path from the Phimai Town, along with Lan Haeng Panya (Canny Arena), the public gathering place and Chong Maew Baray, ancient baray.

Section- C show inside the Phimai's Old Baray area with Sala Klang Nam (Floating Pavilion).

Section- D show Lan Phalang Chiwit (Food Resurgence Plaza), where visitor can enjoy their food and beverages alongside with Phimai's Old Baray picturesque view.

Section- E show the water gate bridge, where is the input of water from Khem Canal that has a steady flow in Phimai's Old Baray.

Section- F show an area of Suan Sukkhaphap Phimai (Phimai's Exercise Community Park). Suan Sukkhaphap Phimai are used by people of all ages and of different fitness levels as part of a healthy lifestyle, from lunchtime joggers to Olympic and Paralympic athletes.

Section- G show the rice paddies in surrounding and the small floating sala (pavilion) at Phimai's Old Baray, where visitor take advantage of inside view of Phimai's Old Baray. Also visitor can rent the canoe & rowboat for outdoor activities.

Section- H show the surrounding environment of nature pond connected to the Uthayan Asia Ratchaphruek (Asian's flower in the nostalgia garden), where visitor will enjoy different species of flowers in Asian.

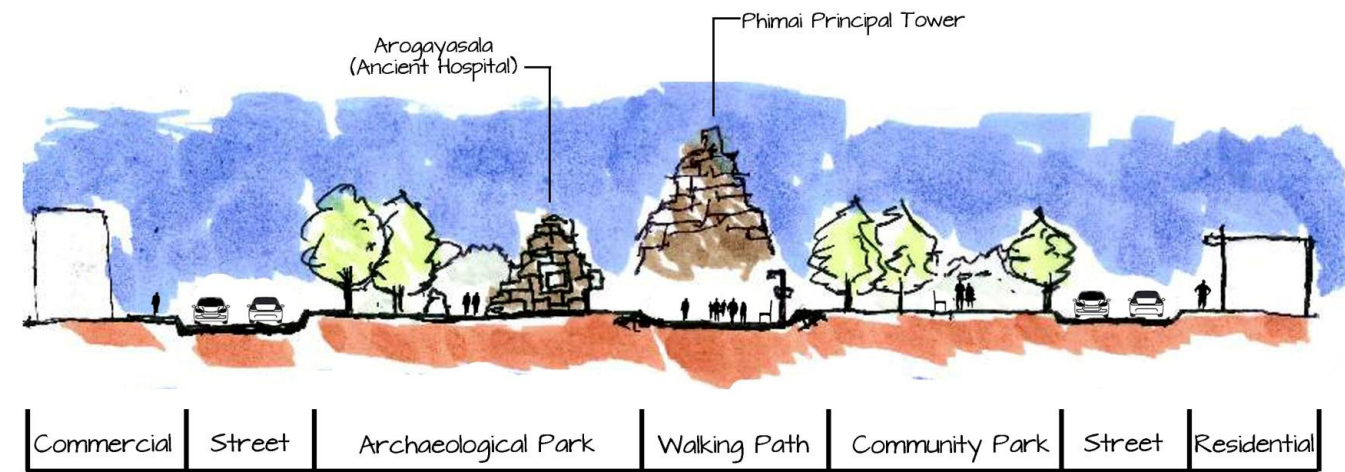
Section- I show Phimai's Old Baray from east to west. East of the Phimai's Old Baray surrounding by rice paddies. On the other hand, western is wet land with nature ponds.

Section- J show Phimai's Old Baray from east to west with small floating sala (pavilion) at both side. Small floating sala (pavilion) allow visitor to enjoy the outdoor activities and Loi krathong Activity.

Section- K show where Lan Phakphon (Recreation Center Garden) is located. Visitor can relax and meditate around the space that filled with winding trails, rice paddies and sycamore trees.

Section- L show the location of Phimai's local farmer market on the south of Phimai's Old Baray. Visitor can walk from the Phimai's Old Baray area and pass the flower garden to Phimai's local farmer market easily.

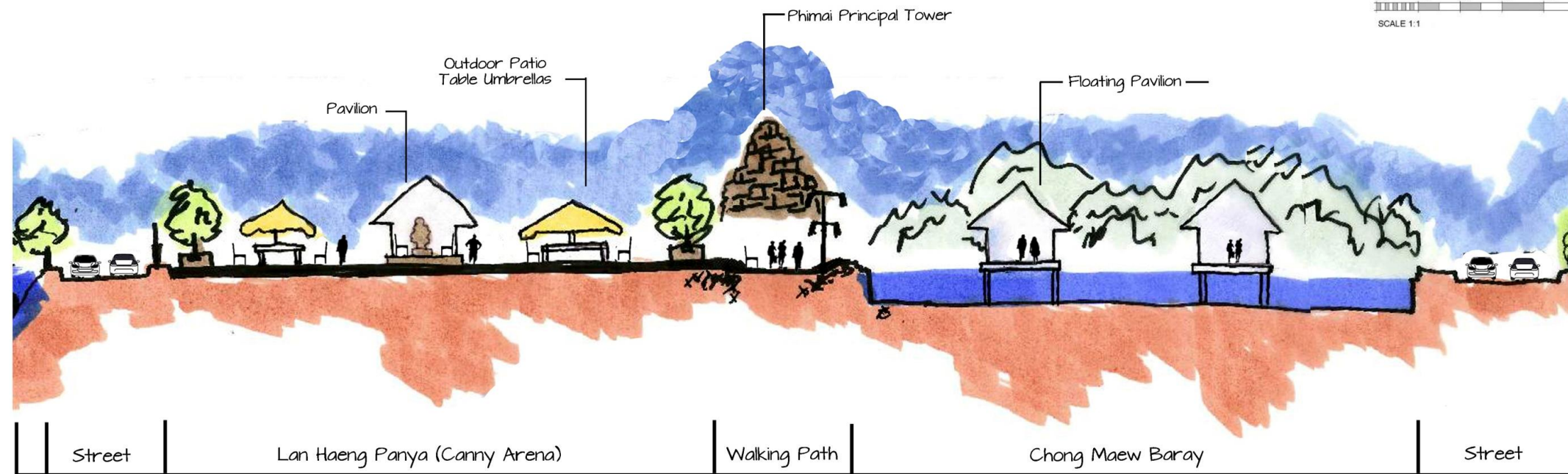
Figure 88: The Ancient Baray of Phimai Master Plan Section Cut Identification
All the section drawings produced by Olmtong Ektanitphong.



SECTION - A

0m 2m 4m 6m 8m 10m
SCALE 1:1

Figure 89: Section- A show the royal road walking path from the Phimai Town and archaeological park with commercial surrounding.



SECTION - B

0m 2m 4m 6m 8m 10m
SCALE 1:1

Figure 90: Section- B show the royal road walking path from the Phimai Town, along with Lan Haeng Panya (Canny Arena), the public gathering place and Chong Maew Baray, ancient baray with floating pavilion before reaching the Phimai's Old Baray area.

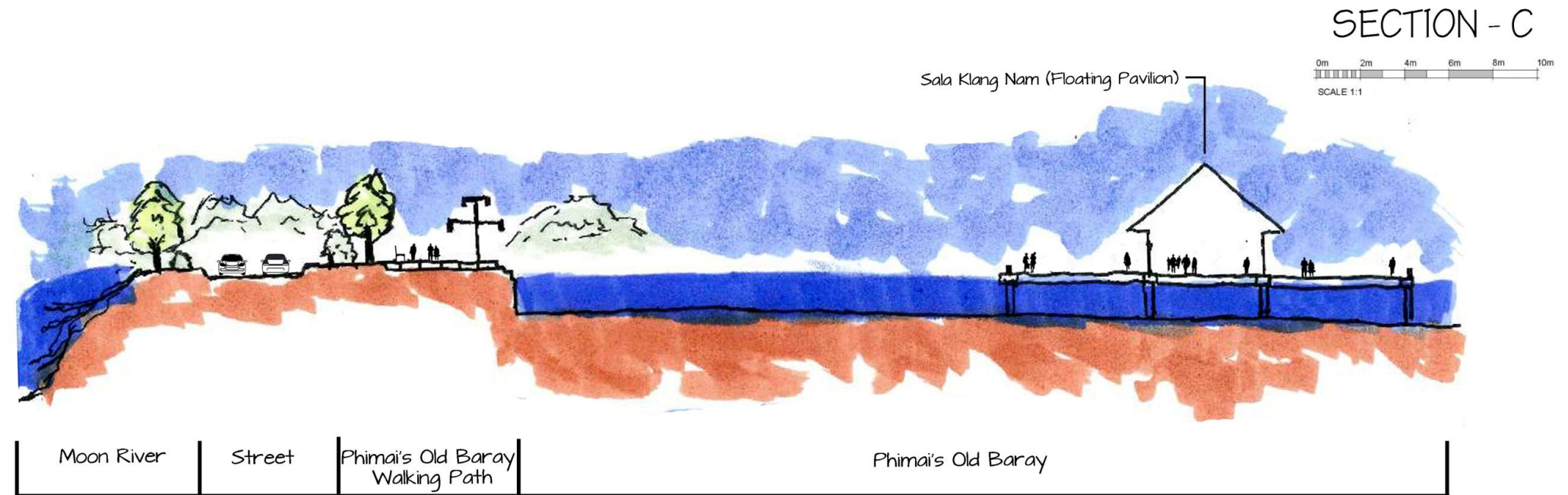


Figure 91: Section- C show inside the Phimai's Old Baray area with Sala Klang Nam (Floating Pavilion), where is the first place visitor will be approaching when enter the Phimai's Old Baray.

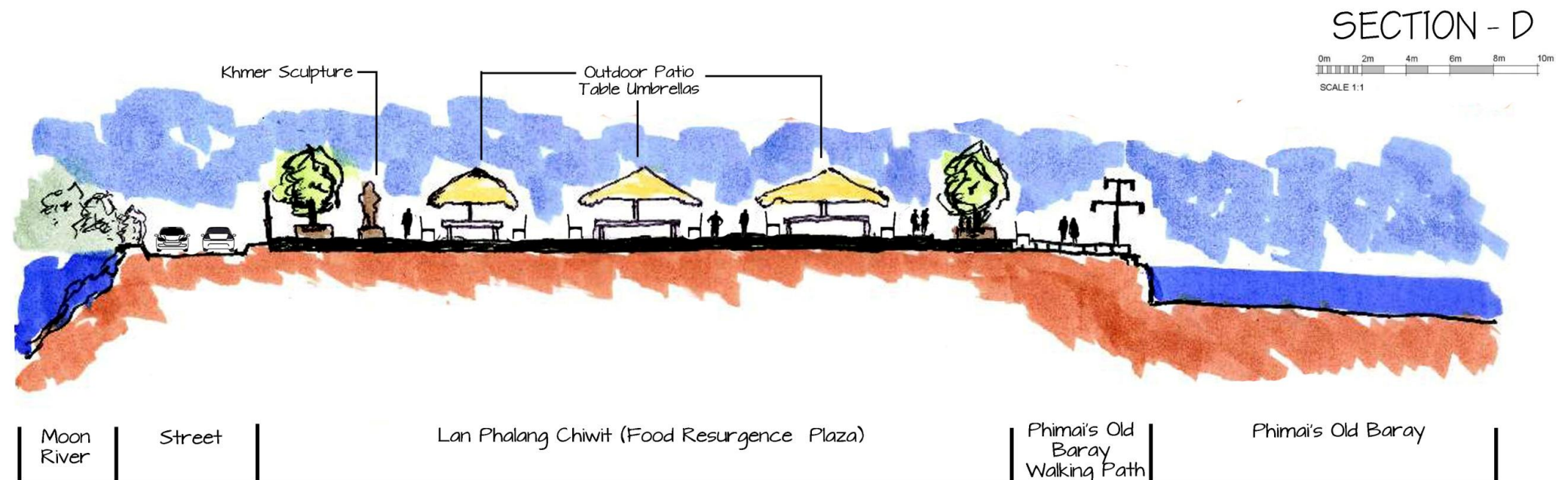


Figure 92: Section- D show Lan Phalang Chiwit (Food Resurgence Plaza), where visitor can enjoy their food and beverages alongside with Phimai's Old Baray picturesque view.

SECTION - E

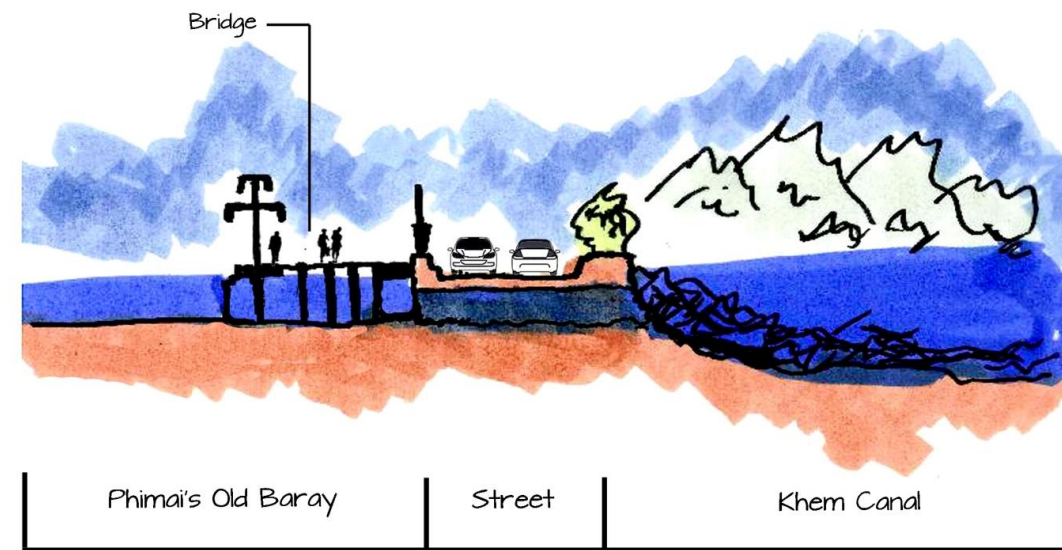


Figure 93: Section- E show the water gate bridge, where is the input of water from Khem Canal that has a steady flow in Phimai's Old Baray. There are three water gate bridges, where water flow into the Phimai's Old Baray.

SECTION - F

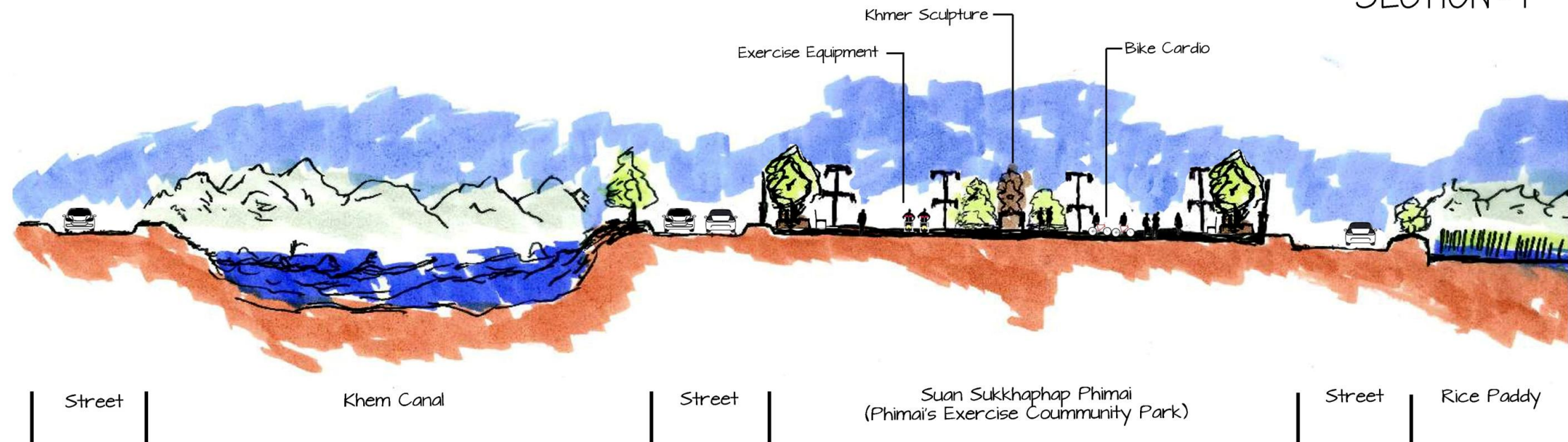


Figure 94: Section- F show an area of Suan Sukkhaphap Phimai (Phimai's Exercise Community Park). Suan Sukkhaphap Phimai are used by people of all ages and of different fitness levels as part of a healthy lifestyle, from lunchtime joggers to Olympic and Paralympic athletes. Visitors can benefit from, enjoy and engage in fitness training in a variety of outdoor environments.

SECTION - G

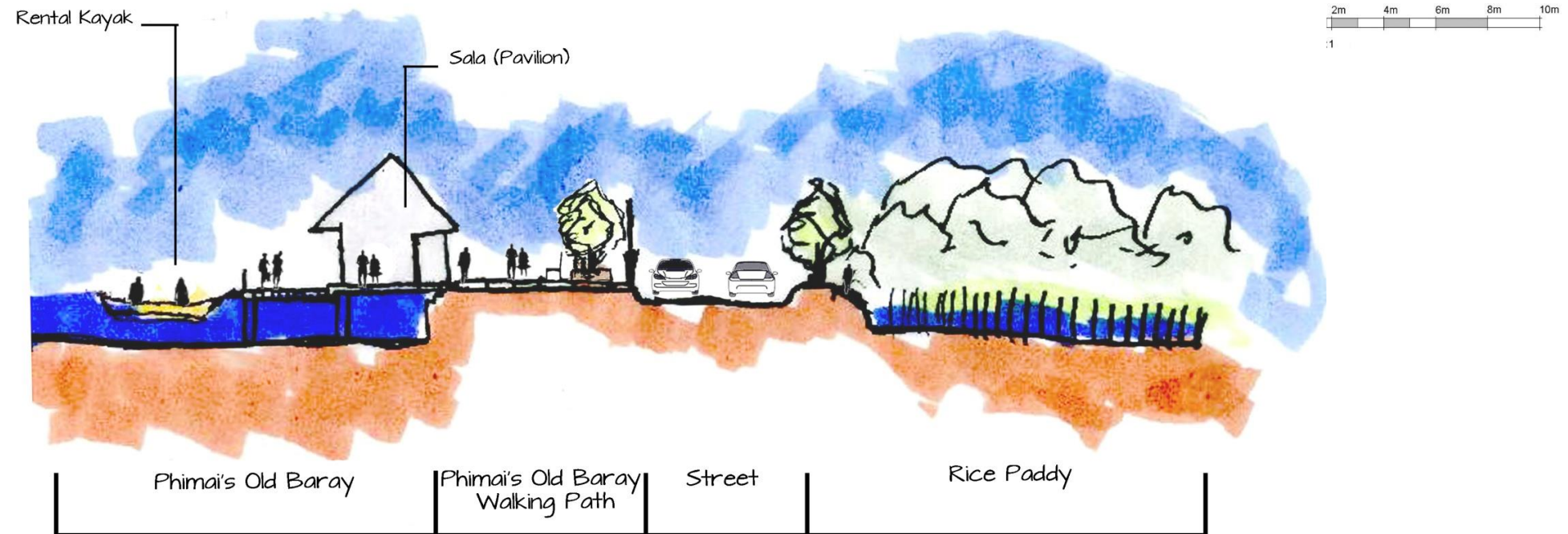


Figure 95: Section- G show the rice paddies in surrounding and the small floating sala (pavilion) at Phimai's Old Baray, where visitor take advantage of inside view of Phimai's Old Baray. Also visitor can rent the canoe & rowboat for outdoor activities.

SECTION - H

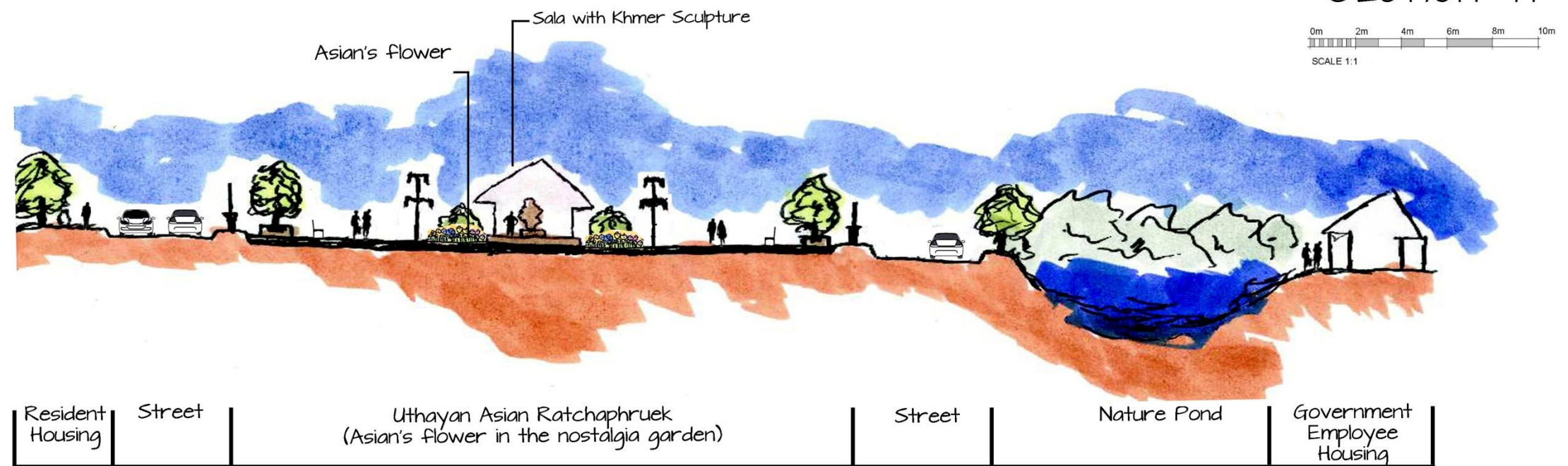


Figure 96: Section- H show the surrounding environment of nature pond connected to the Uthayan Asia Ratchaphruek (Asian's flower in the nostalgia garden), where visitor will enjoy different species of flowers in Asian. Also visitors are welcome to browse the nursery any day of the week and purchase local plants and flowers at the flower Shop inside the garden

SECTION - I

0m 4m 6m 8m 10m 12m
SCALE 1:1

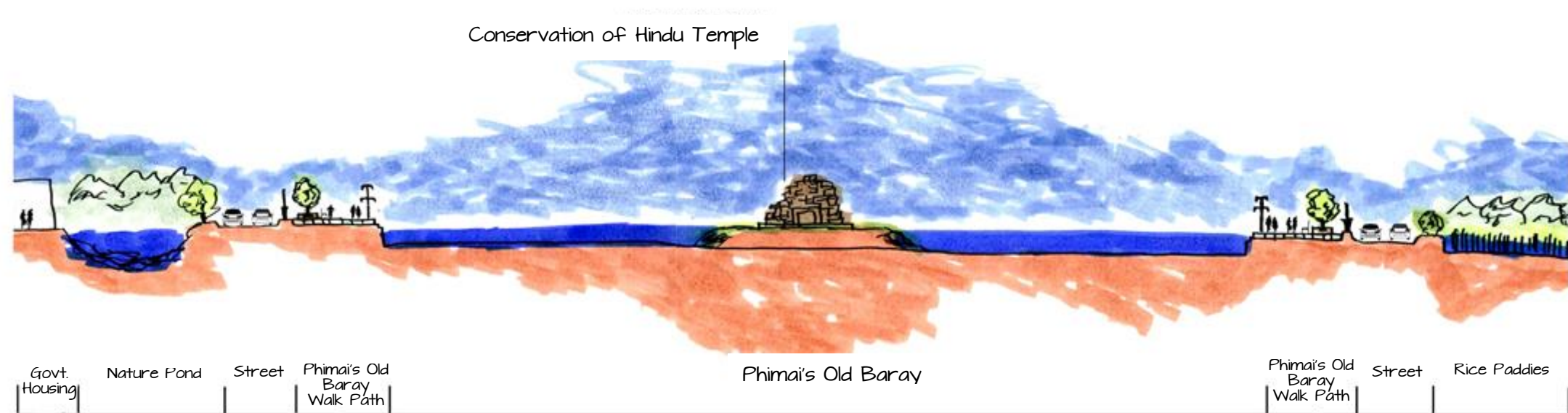


Figure 97: Section- I show Phimai's Old Baray from east to west. East of the Phimai's Old Baray surrounding by rice paddies. On the other hand, western is wet land with nature ponds.

SECTION - J

0m 4m 6m 8m 10m 12m
SCALE 1:1

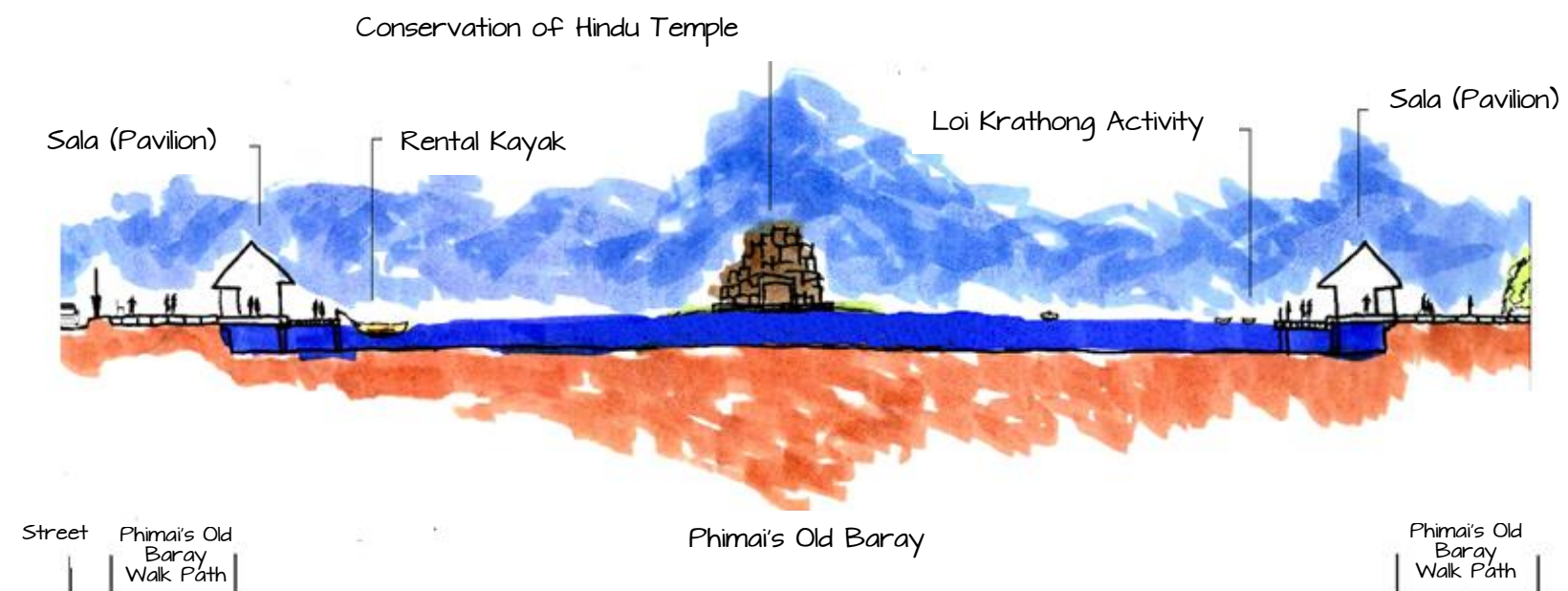


Figure 98: Section- J show Phimai's Old Baray from east to west with small floating sala (pavilion) at both side. Small floating sala (pavilion) allow visitor to enjoy the outdoor activities and Loi krathong Activity.

SECTION - K

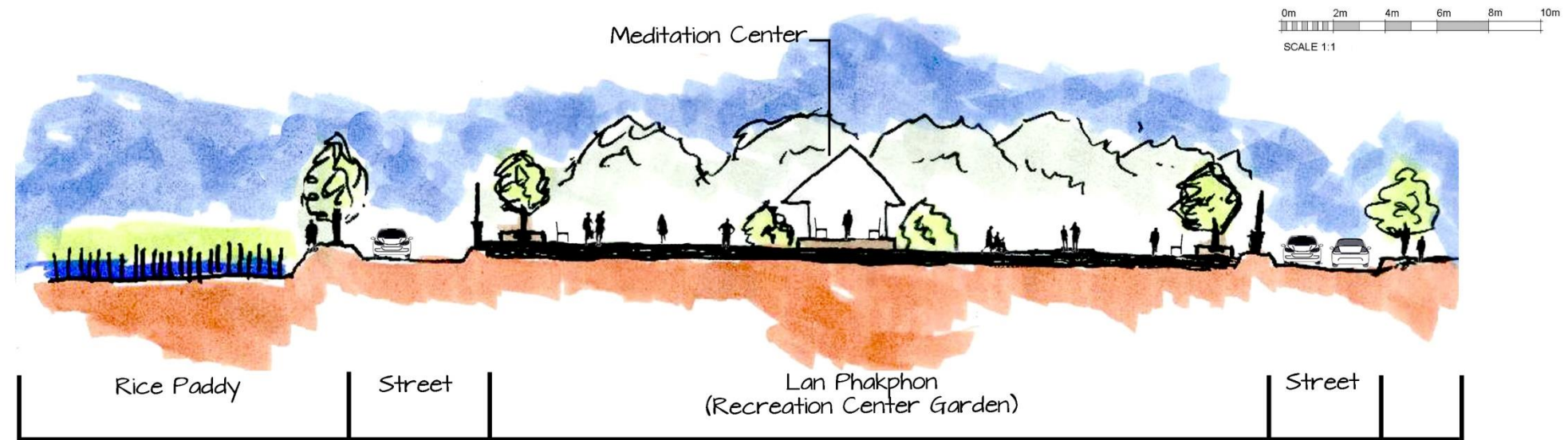


Figure 99: Section- K show where Lan Phakphon (Recreation Center Garden) is located. Visitor can relax and meditate around the space that filled with winding trails, rice paddies and sycamore trees.

SECTION - L

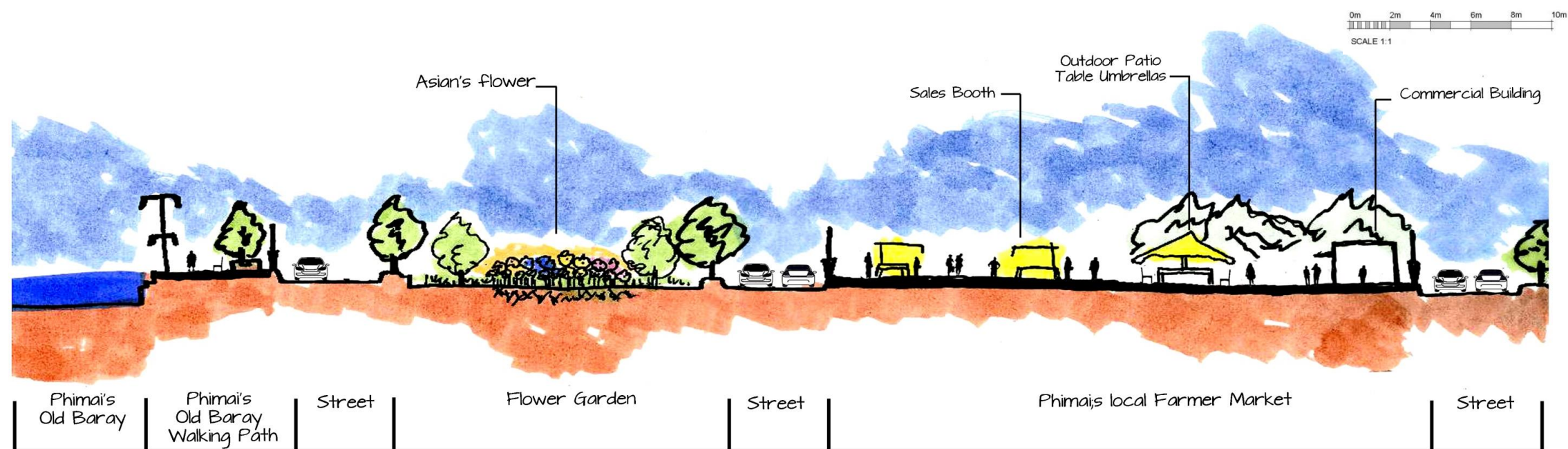


Figure 100: Section- L show the location of Phimai's local farmer market on the south of Phimai's Old Baray. Visitor can walk from the Phimai's Old Baray area and pass the flower garden to Phimai's local farmer market easily.



Perspective View 1.	The Royal Road front gate from Phimai Town to Phimai's Old Baray.
Perspective View 2.	The Royal Road Lounge, Archaeological Park along the travel lounge.
Perspective View 3.	The Royal Road Lounge, Small Baray (pool) sitting area.
Perspective View 4.	The Royal Road Lounge, 24 feet wide-walking path with Buddha Sculpture.
Perspective View 5.	The Royal Road Lounge, Sitting Plaza with food and beverage kiosks.
Perspective View 6.	The Royal Road Lounge, Thai Style Temple.
Perspective View 7.	The Royal Road Lounge, Lan Haeng Panya (Canny Arena)
Perspective View 8.	The Entrance of Phimai's Old Baray, Front facing to Sala Klang Nam(Big Pavilion).
Perspective View 9.	Phimai's Old Baray, inside the Sala Klang Nam(Big Pavilion).
Perspective View 10.	Western Side pathway walk Of Phimai's Old Baray, Front facing to Lan Phalang Chiwit (Food Resurgence Plaza).
Perspective View 11.	Western Side pathway walk Of Phimai's Old Baray, Inside Lan Phalang Chiwit (Food Resurgence Plaza).
Perspective View 12.	Western Side pathway walk Of Phimai's Old Baray, path walk Of the Baray with small pavilion from point to point.
Perspective View 13.	Western Side pathway walk Of Phimai's Old Baray, The Biodiversity surrounding the pathway for shading purpose.
Perspective View 14.	Western Side pathway walk Of Phimai's Old Baray, Front facing Uthayan Asian Ratchaphruek (Asian's flower in the nostalgia garden).
Perspective View 15.	Western Side pathway walk Of Phimai's Old Baray, Inside Uthayan Asian Ratchaphruek
Perspective View 16.	Western Side pathway walk Of Phimai's Old Baray, Inside Uthayan Asian Ratchaphruek
Perspective View 17.	Western Side pathway walk Of Phimai's Old Baray, Inside Uthayan Asian Ratchaphruek, where visitor can be sit and relax at the garden's pavilion.
Perspective View 18.	The local Farmer market Southern side Of Phimai's Old Baray, inside the local Farmer market,
Perspective View 19.	The local Farmer market Southern side Of Phimai's Old Baray, Front facing from the Phimai's Old Baray to The local Farmer market,
Perspective View 20.	The local Farmer market Southern side Of Phimai's Old Baray,
Perspective View 21.	Southern side Of Phimai's Old Baray, path walk Of the Baray facing to the Western side of the Baray.
Perspective View 22.	Eastern side Of Phimai's Old Baray, Front facing to Lan Phakphon.
Perspective View 23.	Eastern side Of Phimai's Old Baray, Front facing through the small floating pavilion to Lan Thung Khao (Scenic Spots for Rice Paddies).
Perspective View 24.	Eastern side Of Phimai's Old Baray, At Lan Thung Khao (Scenic Spots for Rice Paddies).
Perspective View 25.	Eastern side Of Phimai's Old Baray, Front facing to Pratu-nam Phan Baray.
Perspective View 26.	Eastern side Of Phimai's Old Baray, Front facing to Hindu temple that located in the middle of the Phimai's Old Baray.
Perspective View 27.	Eastern side Of Phimai's Old Baray, Front facing to Suam Sukkhaphap Phimai (Phimai's Exercise Community Park),
Perspective View 28.	Eastern side Of Phimai's Old Baray, Inside Suam Sukkhaphap Phimai (Phimai's Exercise Community Park) area, local and visitor can do group exercise at the aerobics plaza.
Perspective View 29.	Eastern side Of Phimai's Old Baray, Inside Suam Sukkhaphap Phimai (Phimai's Exercise Community Park) area, facing the Buddha Pavilion.

Figure 101: The Ancient Baray of Phimai perspective View Identification
All the perspective drawings produced by Olmtong Ektanitphong.



Figure 102: Perspective View 1. At The Royal Road front gate from Phimai Town to Phimai's Old Baray.



Figure 103: Perspective View 2. At The Royal Road Lounge, Archaeological Park along the travel lounge.



Figure 104: Perspective View 3. At The Royal Road Lounge, Small Baray (pool) sitting area.



Figure 105: Perspective View 4. At The Royal Road Lounge, 24 feet wide-walking path with Buddha Sculpture.



Figure 106: Perspective View 5. At The Royal Road Lounge, Sitting Plaza with food and beverage kiosks.



Figure 107: Perspective View 6. At the Royal Road Lounge, Thai Style Temple.



Figure 108: Perspective View 7. At The Royal Road Lounge, Lan Haeng Panya (Canny Arena), the public gathering space before reach the Phimai's Old Baray.



Figure 109: Perspective View 8. At The Entrance of Phimai's Old Baray, Front facing to Sala Klang Nam(Big Pavilion), which is location of visitor information area.

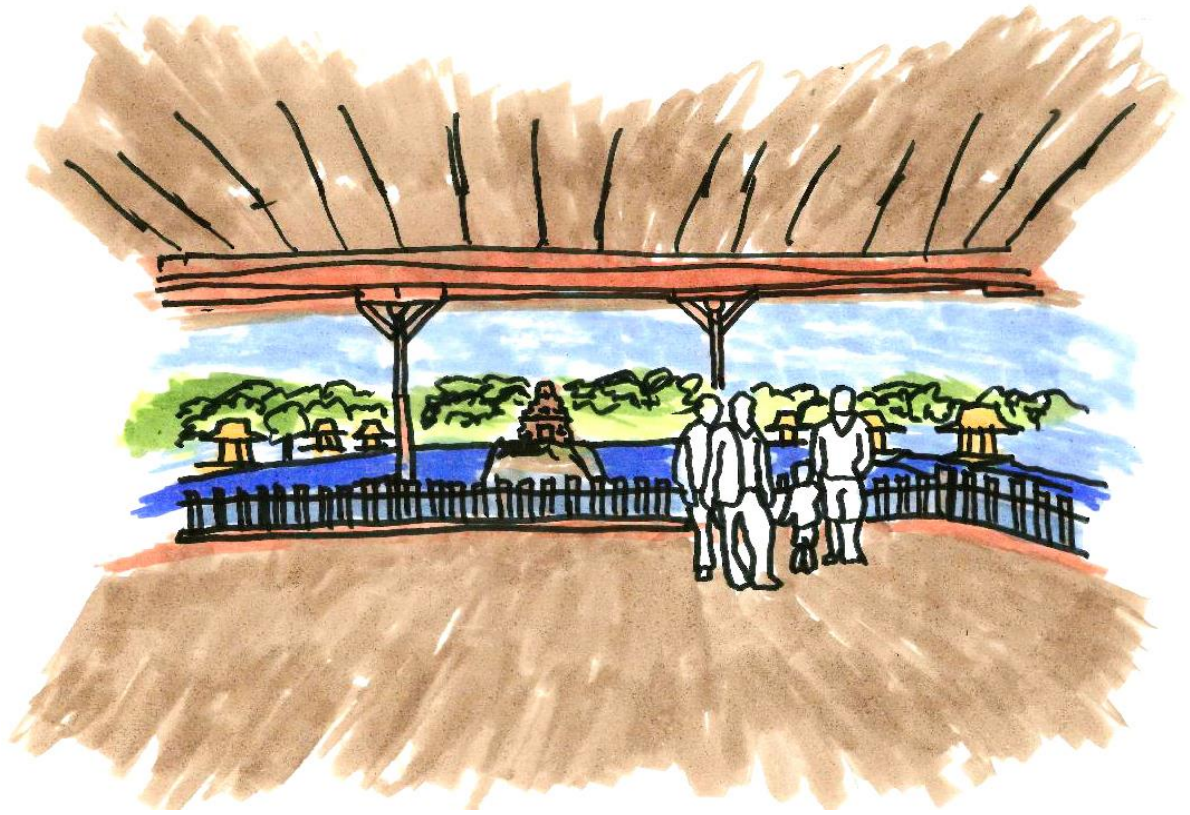


Figure 110: Perspective View 9. At Phimai's Old Baray, inside the Sala Klang Nam(Big Pavilion) visitors can experience picturesque view of Phimai's Old Baray.



Figure 111: Perspective View 10. At Western Side pathway walk Of Phimai's Old Baray, Front facing to Lan Phalang Chiwit (Food Resurgence Plaza), where many local restaurants welcome to visitor.



Figure 112: Perspective View 11. At Western Side pathway walk Of Phimai's Old Baray, Inside Lan Phalang Chiwit (Food Resurgence Plaza), where many local restaurants located and setting area.



Figure 113: Perspective View 12. At Western Side pathway walk Of Phimai's Old Baray, path walk Of the Baray with small pavilion from point to point.



Figure 114: Perspective View 13. At Western Side pathway walk Of Phimai's Old Baray, The Biodiversity surrounding the pathway for shading purpose.



Figure 115: Perspective View 14. At Western Side pathway walk Of Phimai's Old Baray, Front facing Uthayan Asian Ratchaphruek (Asian's flower in the nostalgia garden).



Figure 116: Perspective View 15. At Western Side pathway walk Of Phimai's Old Baray, Inside Uthayan Asian Ratchaphruek (Asian's flower in the nostalgia garden), where visitor can enjoy the Asian's flower.



Figure 117: Perspective View 16. At Western Side pathway walk Of Phimai's Old Baray, Inside Uthayan Asian Ratchaphruek (Asian's flower in the nostalgia garden), where visitor can be experience the flower nursery.



Figure 118: Perspective View 17. At Western Side pathway walk Of Phimai's Old Baray, Inside Uthayan Asian Ratchaphruek (Asian's flower in the nostalgia garden), where visitor can be sit and relax at the garden's pavilion.



Figure 119: Perspective View 18. The local farmer market Southern side of Phimai's Old Baray, inside the local farmer market, where visitor can shop for the local fresh food and made hand souvenir.



Figure 120: Perspective View 19. The local farmer market Southern side Of Phimai's Old Baray, Front facing from the Phimai's Old Baray to The local Farmer market, where visitor can shop for the local fresh food and made hand souvenir.



Figure 121: Perspective View 20. The local farmer market Southern side Of Phimai's Old Baray, Front facing from the The local Farmer market to Phimai's Old Baray area.

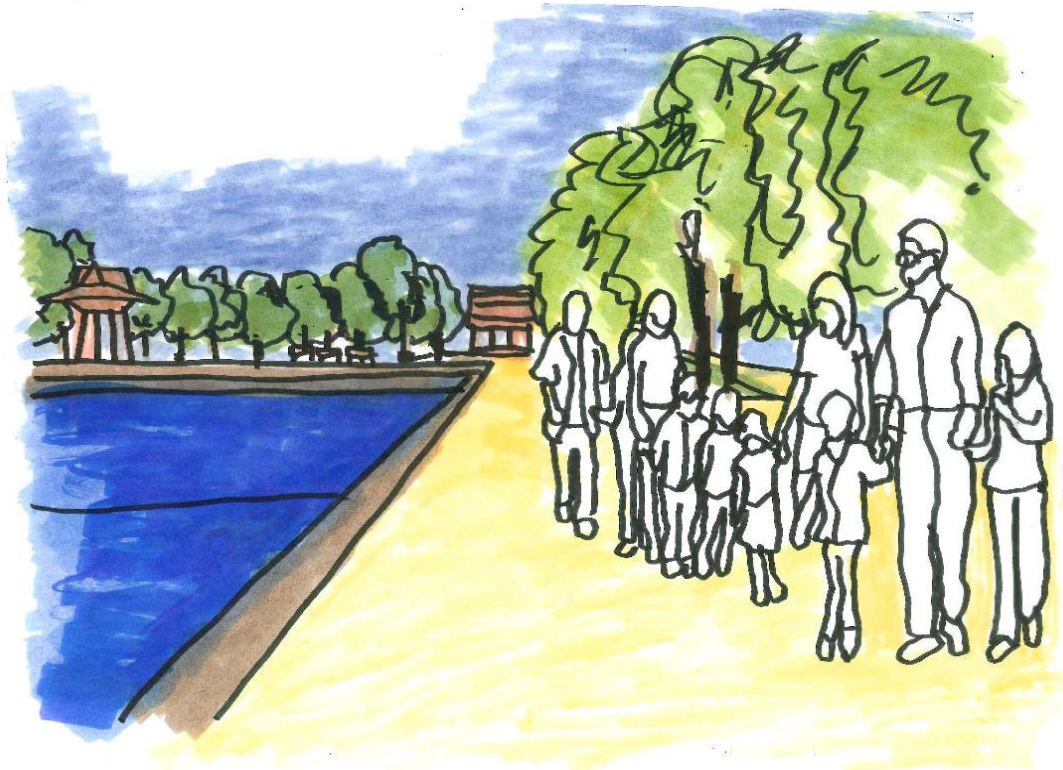


Figure 122: Perspective View 21. At Southern side Of Phimai's Old Baray, path walk Of the Baray facing to the Western side of the Baray.



Figure 123: Perspective View 22. At Eastern side Of Phimai's Old Baray, Front facing to Lan Phakphon, the location of meditation center, where visitor can enjoy the peacefulness environment.

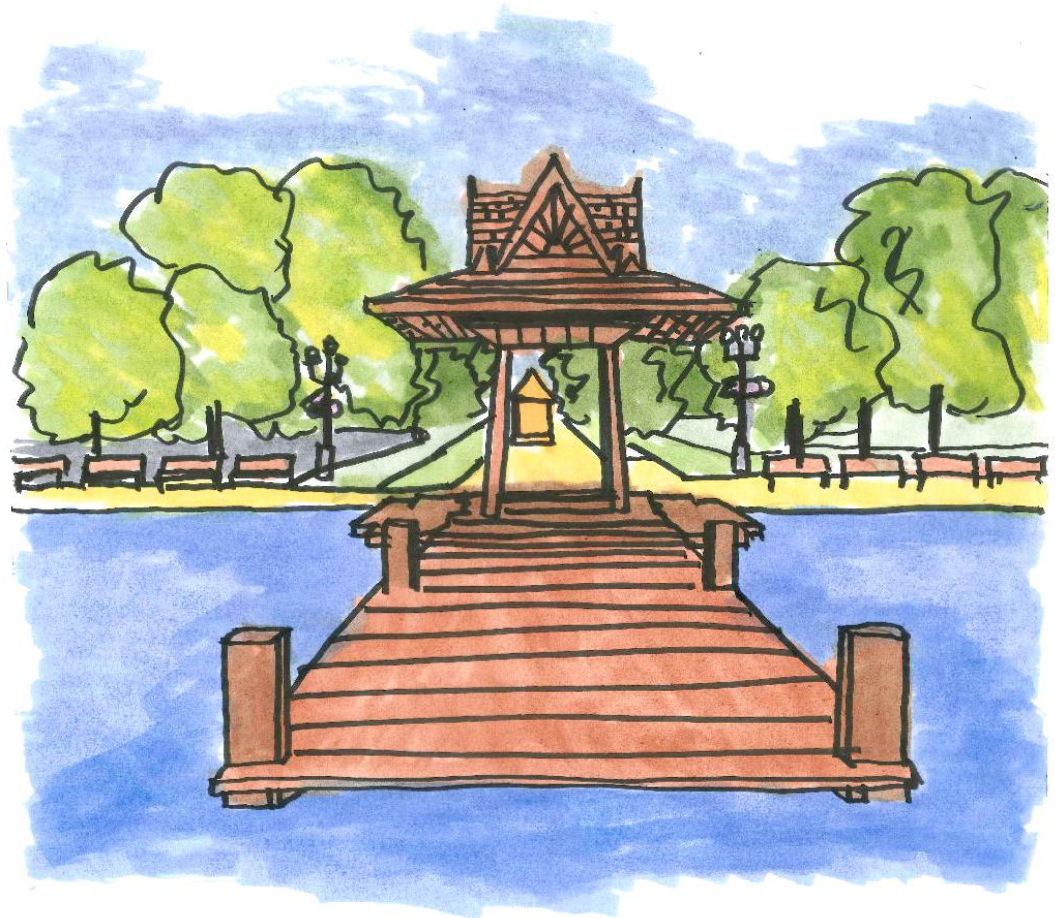


Figure 124: Perspective View 23. At Eastern side Of Phimai's Old Baray, Front facing through the small floating pavilion to Lan Thung Khao (Scenic Spots for Rice Paddies).



Figure 125: Perspective View 24. At Eastern side Of Phimai's Old Baray, At Lan Thung Khao (Scenic Spots for Rice Paddies) area, visitor can enjoy the surrounding agriculture of Phimai.



Figure 126: Perspective View 25. At Eastern side Of Phimai's Old Baray, Front facing to Pratu-narm Phan Baray (water-gate pool), visitor can sit at small pavilion and enjoy rice paddies scenery.



Figure 127: Perspective View 26. At Eastern side Of Phimai's Old Baray, Front facing to Hindu temple that located in the middle of the Phimai's Old Baray.



Figure 128: Perspective View 27. At Eastern side Of Phimai's Old Baray, Front facing to Suam Sukkhaphap Phimai (Phimai's Exercise Community Park), where visitor and local can enjoy their exercise.

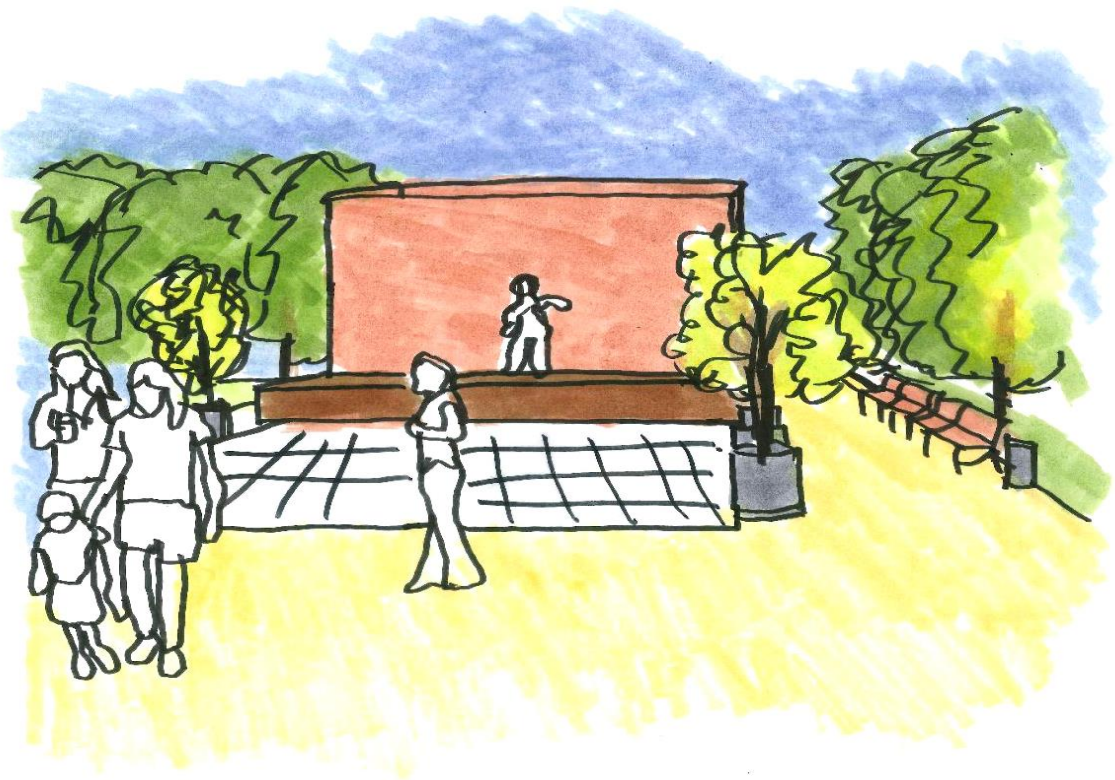


Figure 129: Perspective View 28. At Eastern side Of Phimai's Old Baray, Inside Suam Sukkhaphap Phimai (Phimai's Exercise Community Park) area, local and visitor can do group exercise at the aerobics plaza.

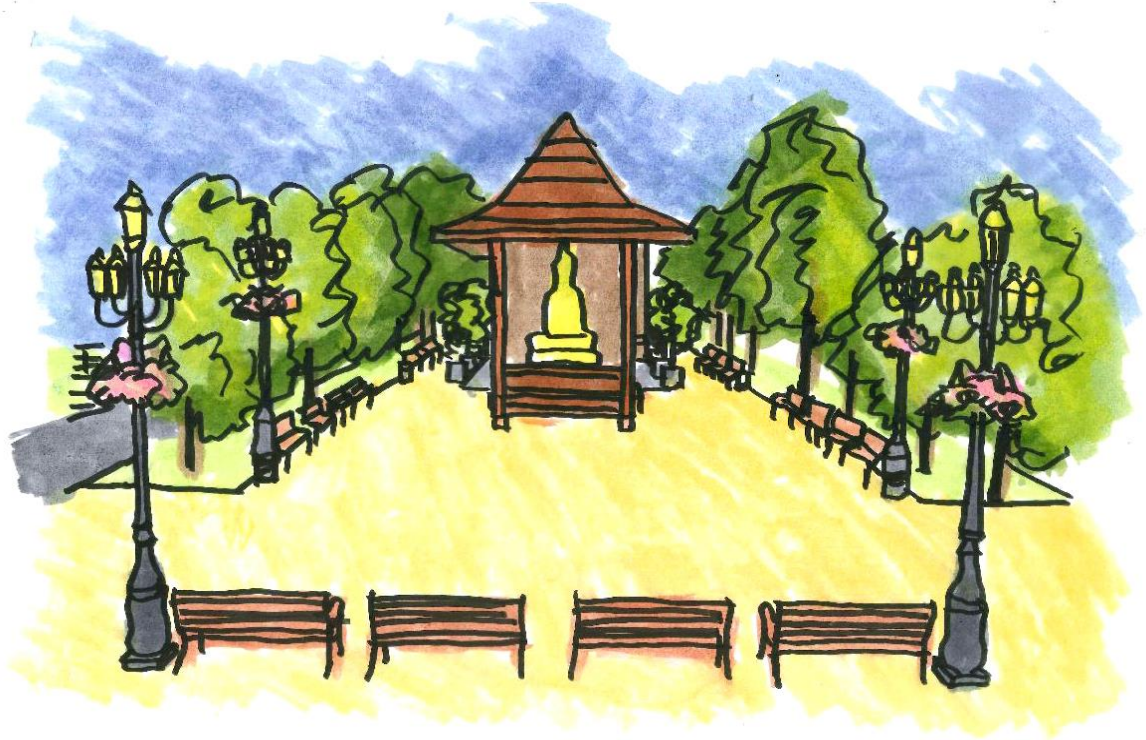


Figure 130: Perspective View 29. At Eastern side Of Phimai's Old Baray, Inside Suam Sukkhaphap Phimai (Phimai's Exercise Community Park) area, facing the Buddha Pavilion.



Figure 131: Aerial view from Phimai Town to Phimai's Old Baray show surrounding context, such as neighbor cities and the Moon River. Moon River is the main water source for Phimai Town and Phimai's Old Baray.

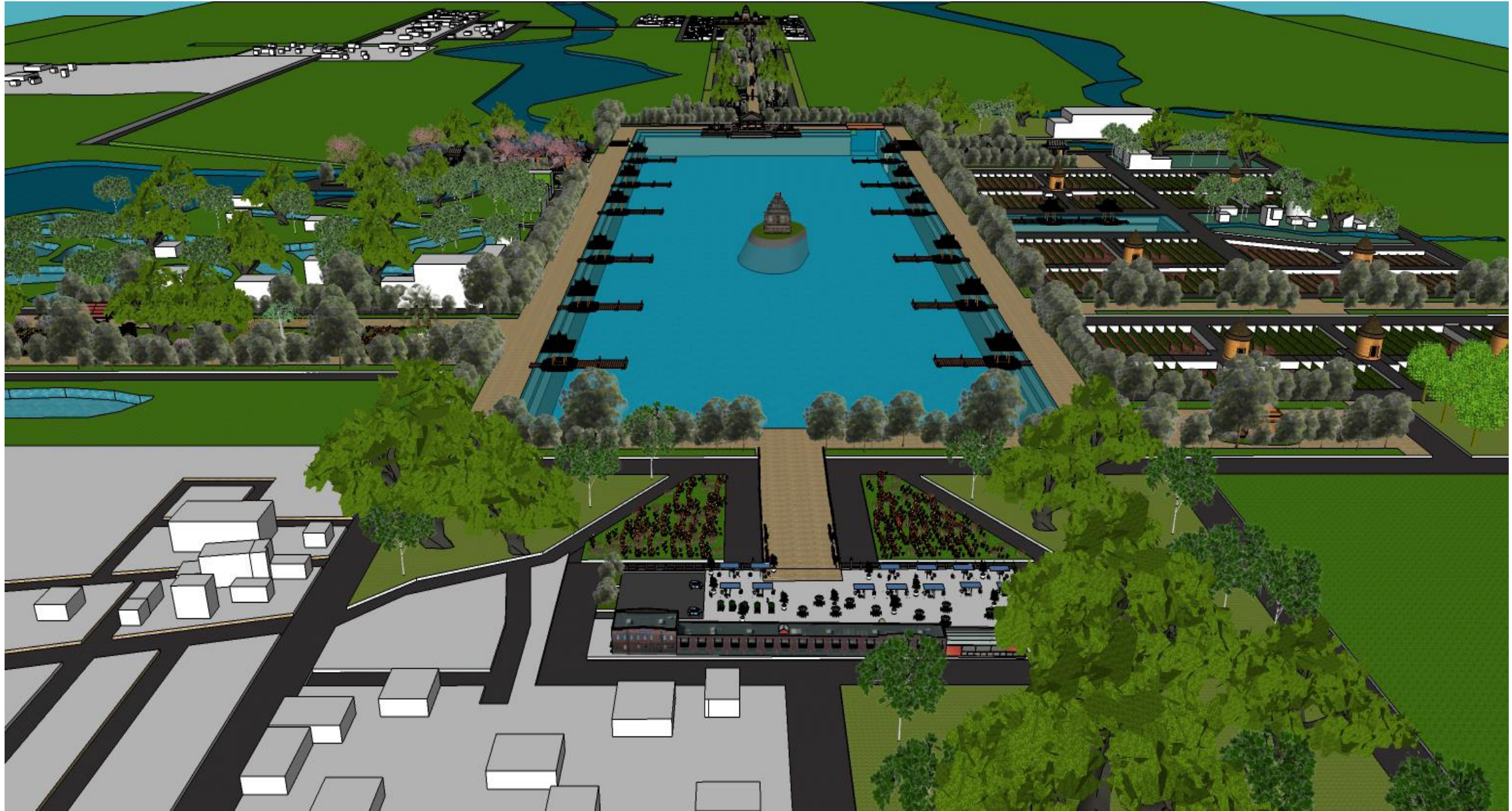


Figure 132: Aerial view from local farmer marker to Phimai's Old Baray. The visual character of the landscape setting shows increasing biodiversity in Phimai's Old Baray and its surrounding. Also shows the connection between villages on the south and Phimai's Old Baray.



Figure 133: Aerial view from west of Phimai Town and Phimai's Old Baray. The view show the connection of Moon River and Phimai's Old Baray. The water input from Moon River and Canal create a steady flow in Phimai's Old Baray.



Figure 134: Aerial view from East of Phimai Town and Phimai's Old Baray. The view shows the connection of agriculture industry and Phimai's Old Baray. Khmers' development of a carefully network of baray reveals an ingenuity to integrate a productive agricultural/irrigation system.



Figure 135: Aerial view at Phimai's Old Baray and the rice paddies. The view shows the connection between the walking paths of Phimai's Old Baray to agriculture zoning.



Figure 136: Aerial view from west to rice paddies. The view shows the link between rice paddies and small Sala (pavilion) of Phimai's Old Baray.



Figure 137: Aerial view from east to the Community Park with nature pond surrounding Phimai's Old Baray. The view shows the pattern of connection between Uthayan Asian Ratchaphruek (Asian flower in the Nostalgia Garden) at Phimai's Old Baray with its nature environment outside the baray.



Figure 138: 45-degree aerial from South-West show the landscape setting of Phimai's Old Baray and its surrounding content. The view forces on the community park at west side of the Phimai's Old Baray.



Figure 139: 45-degree aerial from South-East show the landscape setting of Phimai's Old Baray and its surrounding content. The view forces on the rice paddies at east side of the Phimai's Old Baray.

Conclusion

Phimai Town is one of the important Site in North-East Thailand. It is the location of the grandest and most important Khmer historical sites in Thailand. The main attraction that enhances the enjoyment and appreciation of the archaeological, historical, and environmental value for Phimai Town is the Old Baray. Currently, the condition of the town continues to urbanize, boosted by increasing numbers of foreign visitors and a growing population. A critical assessment of what Phimai Town could and will be in the future as an international destination needs to be made. Fears of cultural loss, constant degradation of conversation and preservation, and the hope for tourism economics demand a fresh and innovative perspective for future Master Plan developments that marry traditional and contemporary functions to be suitable with both locals and tourists. Also, the future Master Plan development of the town and surrounding areas should be considered in order to work with and benefit from this issue. In the guideline concept of “learn from the past, live in the present, plan for the future”.

Fundamental to the theme of the Ancient Baray of Phimai Master Plan project is the role of Phimai's Old Baray (water reservoir). The Phimai's Old Baray links the past and present aspects of the Phimai Town. The intention is to conserve the outstanding value of the cultural heritage. The comprehensive system of land use planning and environmental conservation and protection has been considered closely. The Master Plan intervention proposals provide a significant degree of protection for areas of archaeological, architectural, historical, cultural, landscape, and ecological importance. Bringing back the important archeological site, Phimai's Old Baray, is a step that will be advantageous to the agricultural industry for local usage. It will also be beneficial for the tourism economics of Phimai Town. After the Ancient Baray of Phimai Master Plan project has been proposed, Phimai's Old Baray will be a new cultural tourist attraction that is conceptually linked to the ancient Khmer Empire. The combination of

archeological site, agricultural industry, and cultural tourism will enhance the new urban experience and cultural values of the present community and also direct the development of the community in the future in appropriate ways. Hopefully, the project of "Reclamation and Regeneration of the Ancient Baray: A proposal for Phimai Historical Park" will be able to provide a guideline for the process, design, and the heritage preservation management of urban planning model, and can be implemented at other heritage sites in Thailand and other countries in the world.

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